..THE IRON AGE..

MARCH 2, 1933

ESTABLISHED 1855

Vol. 131, No. 9

Depreciated Foreign Currencies Obstruct Price Recovery

An Interview with James A. Farrell

JAMES A. FARRELL

PRICE recovery, in Mr. Farrell's opinion, will be difficult so long as the United States is without protection from the competition of depreciated currency countries. Such protection, he asserts, is an immediate need; it cannot be safely withheld until the stabilization of world economic conditions.

"I AM in favor of a balanced budget, not merely for the Federal Government, but for all other governmental units," declared James A. Farrell, chairman of the Foreign Trade Council and retired president of the United States Steel Corpn., when interviewed by G. L. Lacher of THE IRON AGE. "But I cannot agree," he added, "that the mere act of balancing budgets will restore confidence and revive business. What we require is a balanced trade.

"Confidence really means the willingness of lenders to lend and of investors to invest. Manufacturers and producers generally have collected their accounts receivable, paid off their bank loans and lack resources to buy materials to operate. The Reconstruction Finance Corporation or some similar institution could start the wheels going by enabling small manufacturers who provide 60 per cent of the business of the country in normal times to arrange working credits.

"There would remain the difficulty of operating at a profit. So long as prices decline faster than costs can be reduced, the task of putting an enterprise back on a going basis will not be easy."

"Do you believe, then, that the answer lies in further drastic cuts in costs or more determined price resistance on the part of sellers?" Mr. Farrell was asked.

"The answer is not so simple as that," he replied. "The time has come when costs cannot be driven materially lower without serious consequences. A firm position on the part of sellers to advance prices substantially, and hold them, would start a buying movement, and once started it would bring out a large business which is now on the shelf, awaiting further price recessions.

"I am in thorough accord with efforts to stabilize prices, but I do not believe that greater resistance to buying pressure is enough. The major influence unsettling prices in this country is not of domestic origin. Price cutting by domestic manufacturers is an effect, not a cause. The thing that has really pulled the props from under the price structure in this country is the collapse of world prices.

"This truth is not altered by the fact that our imports, like our exports, have declined sharply during the depression and that the total inflow of certain kinds of commodities still represents a small part of our consumption of those products. The volume of imports has no relation to their price influence. Frequently a single phenomenally low foreign price, quoted on what may be only a small percentage of existing demand, will upset the entire market, holding back buying and hence production with a consequent delay in restorative measures. It is like a spoonful of carbon black dropped into a pail of white paint; it doesn't turn the paint black, but it certainly spoils the whole batch."

At this point Mr. Farrell was asked whether economists supported the view that our domestic price levels are governed by world prices. He replied:

"It is surely odd that even at this late date in the depression the public waits breathlessly for the oracular pronouncements of our economist friends. But since you have asked the question, I presume an answer is in order. Yes. At least one economist has emphasized this point. Col. Leonard P. Ayres, vice-president, Cleveland Trust Co., recently made the following statement:

" 'The gold prices of wholesale commodities entering into international trade are always about the same all over the world, after allowance is made for the costs of transportation and taxes. The gold prices of these basic commodities largely control general price levels.'

"I might add that the gold prices for the world have been driven down by currency depreciation in Japan, Great Britain and many other countries. I most certainly do not recommend that we follow these nations off the gold standard and enter a race in depreciation. What world trade

needs most is stability of exchange, and that can be obtained only when currencies are anchored to gold.

"I am well aware of the fact that depreciated currency countries are obtaining trade at our expense, both abroad and in our own market. I recognize also that we are not merely facing an economic war, as President Hoover stated in his New York address; we are in such a war now and have been for some time. The British imperial economic conference at Ottawa launched a trade offensive which affected the United States more than any other country. The Ottawa agreements, it is estimated, will result in a loss of upward of two hundred million dollars annually to American exporters. The exchange equalization fund, amounting to about one hundred and fifty million pounds sterling, has also had its influence by keeping sterling exchange down. We have had depressed world prices and they have delayed the recovery of business in gold standard countries.

"There is no doubt that Great Britain has obtained temporary advantage from this policy. British steel production in 1932 showed an increase over that of 1931, while output in this country declined 48 per cent. The decline in internal prices in Great Britain has been stayed, the forces of deflation there have been checked and the government's budget has been balanced.

Defensive Trade Policy Essential

"But I am convinced that it would be foolhardy for the United States to attempt to meet depreciated currency competition. Our most important market is our own country and by depreciating the dollar we would be entering a race for shrunken world markets with no certainty of adding one whit to our export volume. We would merely accentuate exchange instability and add impetus to competitive depreciation, which in the end would result in international trade paralysis.

"Until such a time when depreciated currency countries are ready to return to the gold standard, our only logical move is to adopt a defensive trade policy. That is by all odds the greatest need of our country today. We can accomplish nothing by tampering with the dollar. Inflation could turn out bushels upon bushels of new money, but it would not affect the price situation so long as American business was confronted with low-priced foreign competition. We have ample credit reserves, even after the severe deflation we have experienced, but they are not being brought into play because prices are still sinking. And domestic prices cannot stabilize until they are protected from the undermining influence of low world prices.

"It matters little that our country is the richest among all nations in natural resources, in skilled workmanship and in production technique. What matters now is that the United States has suffered most from the depression. Many of our industries are prostrate. Others are piling up deficits and living on their cash reserves. The values of securities have shrunk to a point where they haven't the remotest relation to invested capital.

"I do not oppose international cooperation. On the contrary, I have always done all in my power to foster it. But I know that we must have an eye on realities, just as our foreign friends do, if we expect to get anything more out of such cooperation than one-sided concessions and glory. No one, of course, can say for a certainty what motives lie behind the moves of our international trade rivals. In any event, their recent moves could have been no different if they knew exactly what they wanted and set out to get it.

Protective Measures Imperative

"To checkmate them we should adjust our tariff to offset currency depreciation and do it immediately. That will give domestic prices a chance; it will give profits a chance; it will give credit a chance; it will give employment a chance. Even if we recover only a minor part of the domestic market that we have lost during the depression, we have a chance to get back on our feet. In this connection, it should not be forgotten that there have been great increases in economy and efficiency since the fall of 1929. The steel industry could now break even with a 40 per cent operation and many other industries could probably do as well or possibly better.

"I realize that we cannot shut ourselves in and become a hermit nation. I never have been an isolationist. I don't believe in the 'Buy American' movement. My many years devoted to the promotion of foreign trade should be ample evidence of that. We should buy, as well as sell, but on a world stabilized currency.

"However," continued Mr. Farrell, "in the present uncertain and unstable state of world economy, our first duty is to build up our internal strength. We cannot continue to expose ourselves to the sapping influence of depreciated currency competition without exposing ourselves to grave dangers. While we should continue to lend our support to the cause of world trade stability, we cannot wait for the achievement of such stability before setting our own house in order. The recovery of some semblance of price stability in the United States would be the greatest contribution we could make to the stabilization of international economy. At the very least it would tend to allay our worst difficulties at home and our first duty is to our own country.

"Legislation to offset currency depreciation could not be regarded as an unfriendly act or as a reason for reprisals. We could not be much worse off in world competition than at present, even if we were subjected to further reprisals, but aside from that fact, other nations, among them France and Canada, long ago took such action. Surely if the Dominion of Canada could protect itself from the depreciated currency of Great Britain, no fault could be found with the United States, which is outside of the British Empire, if it should follow suit.

"World trade has been a boon to all mankind, but it should not be pursued at the risk of domestic security. Our own needs command our first attention. We can cut governmental and private expenses time after time in an effort to balance budgets, but unless we insulate ourselves from the effects of international currency depreciation our efforts are likely to prove futile. It is like dumping ballast and cargo from a vessel without pumping water out of the hold or stopping up leaks in the hull. We must stop the leaks in the ship of American business."

German Iron and Steel Trade Lower in 1932

German production of iron and steel and foreign trade in iron and steel products declined substantially in 1932, according to the Commerce Department's iron and steel division.

Pig iron production amounted to 3,933,026 metric tons in 1932 compared with 6,062,313 tons in 1931, a decline of 35 per cent. Steel production amounted to 5,746,001 tons of raw steel compared with the 8,291,250 tons in 1931, a decline of 31 per cent.

Exports of iron and steel in 1932 amounted to 1,979,411 metric tons compared with 3,652,614 tons in 1931, a drop of 46 per cent from the previous year's level. Imports of iron and steel for 1932 amounted to 684,292 tons compared with 833,037 tons in 1931, a drop of 18 per cent.

A meeting on motor lubricants is to be held at the Hotel New Yorker on the afternoon and evening of March 8 by the local sections of the American Society for Testing Materials and the Society of Automotive Engineers. Papers are scheduled from J. L. McCloud, metallurgical chemist, Ford Motor Co.; E. W. Upham, chief metallurgist, Chrysler Corpn.; W. A. Gruse, Mellon Institute of Industrial Research; M. A. Dietrich, Ohio State University; W. H. Graves, chief metallurgist, Packard Motor Car Co.; A. L. Clayden, research engineer, Sun Oil Co., and Arthur Nutt, vice-president in charge of engineering, Wright Aeronautical Corpn.

Plastics—a New Industry Comes of Age

MOLDS are loaded with either powder or preformed pellets of exact weight required, and then locked in place in a hydraulic press.

THE business of making plastic products from phenolic resins has grown amazingly in recent years and has been less affected by the depression than other lines. This article briefly relates how molded and laminated plastic products are manufactured and discusses the present and future markets for them. It urges the metal-working industry to investigate this newcomer, because it is a competitor which should not be underestimated and which in many cases actually helps to increase the use of metal. Equipment builders are told to examine the plastics industry as a possible outlet for their products.

CHARLES F. KETTERING, vice-president of General Motors Corpn., remarked recently that business will shake itself free from stagnation and walk lively again when it offers for sale new services, new interests and new products. One of the new products—that is, new by comparison with old basic materials, such as iron and steel—is plastics and molded products made from phenolic resins. The plastics industry, in fact, has grown so rapidly in so short a time that it may be said to present a paradox to the metal-working industry, for it is both a competitor and a customer.

Although something has been known about plastics for many years, it has come into wide use only in the last decade. Chemical research and large-scale manufacture have made the various raw materials, such as phenol and formaldehyde, steadily cheaper, with the result that plastics have become commercially more practicable.

However, the ability to sell products made of plastic materials at the right price would have little meaning unless they possessed definite outstanding qualities, such as durability, color—which is an integral part of the material—lustrous finish when desired, and economy of manufacture. Their low production cost is due partly to the fact that they can be molded into final form in one operation of a molding press with no polishing, burnishing or machining, except the filing of edges to remove small "fins" formed where parts of the mold come together.

Phenolic resins are formed by the chemical reaction of phenol (carbolic acid) and formalin (formaldehyde solution). In powdered form the material is mixed with a filler of wood, flour, mica, asbestos or other material and is molded under heat and pressure in tool steel dies into various products. The addition of pigments or dyes to the mixture makes it possible to secure whatever color is desired.

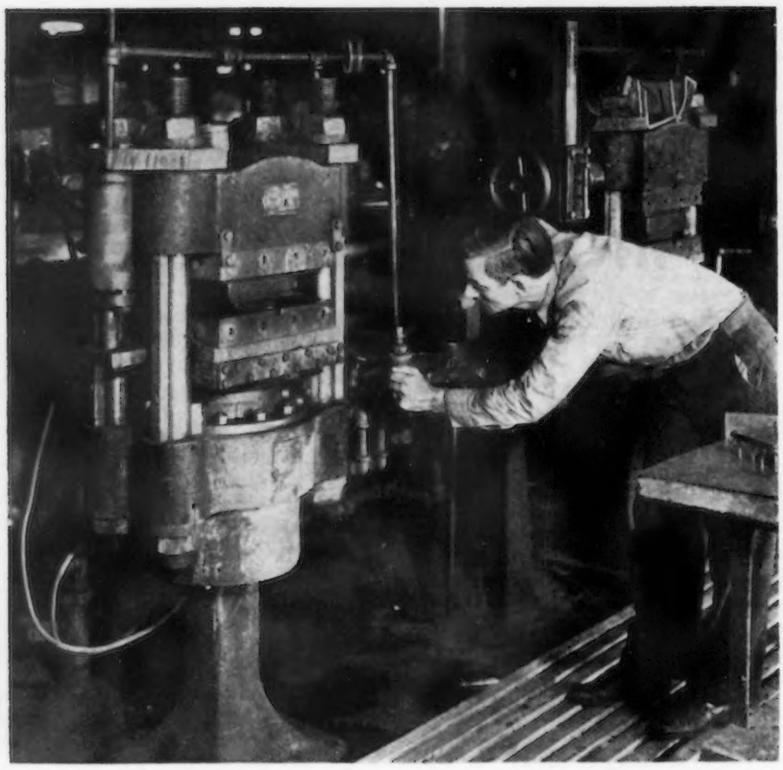
In the production of small parts, gang molding is used. That is, as many as 144 closures for tubes or other articles can be made in one operation of the molding press, usually under a temperature averaging 350 deg. F. and a pressure of 2000 lb. per sq. in. It is this faculty for turning out molded products so simply and without complicated finishing processes that keeps costs at a reasonably low figure.

Producing Laminated Material

In the production of laminated material, the initial resinoid is dissolved in solvents to provide a varnish, which is used to impregnate the laminating fabric (either paper or cloth). The impregnating process is accomplished on special machines. By means of rollers the fabric passes continuously through a dip tank or other device by which a uniform coat of varnish is applied. The varnish-laden sheet then passes to a tower-type dryer where the solvent is evaporated.

After being dried the processed web is cut into sheets of convenient size. A large number are superimposed and placed in a hydraulic press where, under the action of heat and pressure, a hard, dense, rigid plate is produced. The mass of resinoid-impregnated layers thus is transformed into a board which will not delaminate, cannot be resoftened by heat, is non-hygroscopic and possesses un-

A valve assembly and complete shoe guide, a device attached to the first section of steel piping which is lowered into an oil well. It serves both as a guide and a valve mechanism to control the flow of water, which is pumped through to clean out sludge. When the shoe is finally lowered to the bottom of the well, a drill is inserted in the tube which cuts through and removes practically all the plastic material in the shoe.



Several thousand pounds of hydraulic pressure closes the two sections of the mold. At the same time the steam heat is making the compound flow to the exact shape desired.

usual mechanical and diaelectric strength.

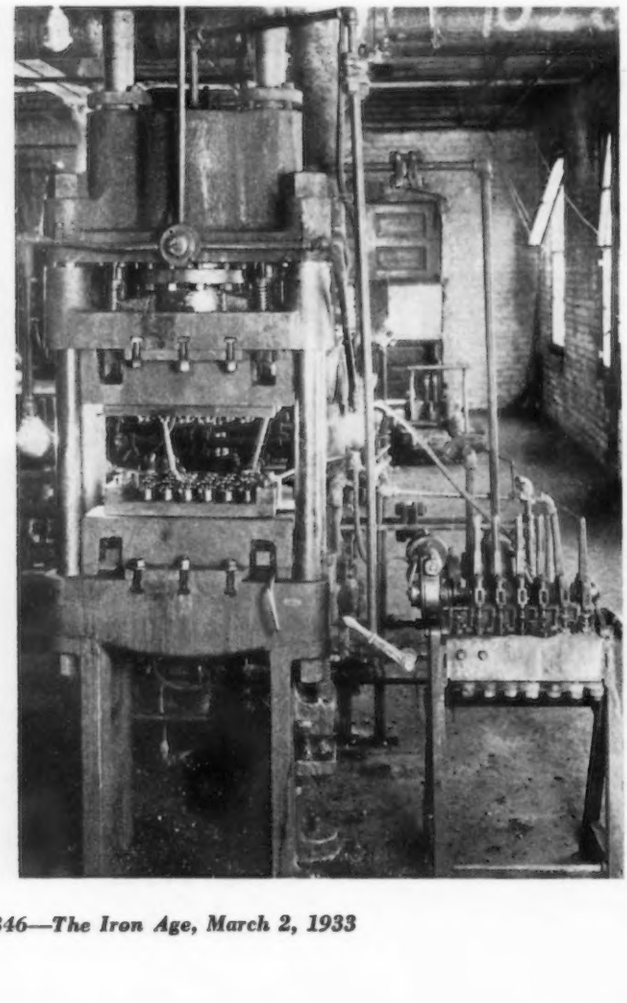
Service requirements determine which type of laminated stock should be utilized. Thus, craft paper with a 35 per cent impregnation of resinoid has remarkable resiliency, while rag papers with richer impregnations are used for insulation value and resistance to moisture, such as in radio panels. Linen-laminated sheets are specially adapted to applications where a dense, close-grained product is desired. It is particularly suitable for punched parts, its fine texture insuring clean-cut, smooth edges, and for the cutting of gears of small face dimension.

Canvas-laminated material yields a product of the highest compressive and tensile strengths, particularly desirable for gears in automobiles and for large motor drives on industrial machinery.

Making Laminated Tubes and Special Shapes

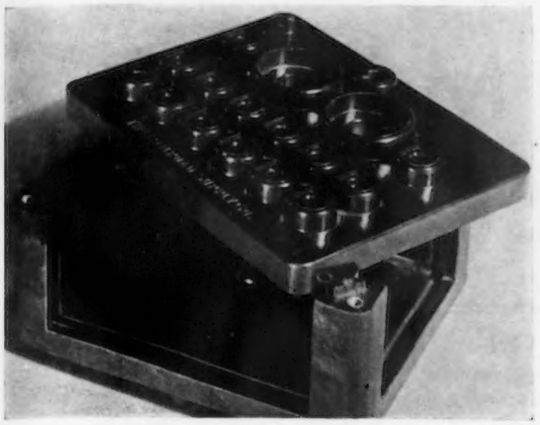
Laminated stock is manufactured not only into sheets, but also into tubes, rods and special shapes. Tubes are made by winding the impregnated fabric on to mandrels, subsequent application of heat converting the resinoid binder to its final durable and resistant stage. "Rolled" tubes are baked while on the mandrels, but "molded" tubes are removed from the mandrels and inserted in steel molds conforming in dimension to the exterior of the finished tube. Tubes over 8 in. in diameter are usually rolled.

Laminated rods are machined from sheet stock, the laminations appearing on a circular section as parallel chords. Rods also are made by winding the impregnated fabric on a wire, then molding the product in a cylin-



After the powder has fluxed and cured, the mold is opened and the pieces removed. This view shows the gang-molding of a dozen and a half small mechanical parts.

An industrial application of molded plastics. This control wheel weighs only slightly more than a pound, replacing a wheel of another material weighing nearly seven pounds. Molded wheels require no finishing except removal of slight fins in the manufacturing process.



Molded plastics are popular in electrical manufacturing. They are formed into intricate shapes in a single operation, coming from the mold with inserts, bushings and metal parts permanently imbedded.

drical steel mold after withdrawing the wire core.

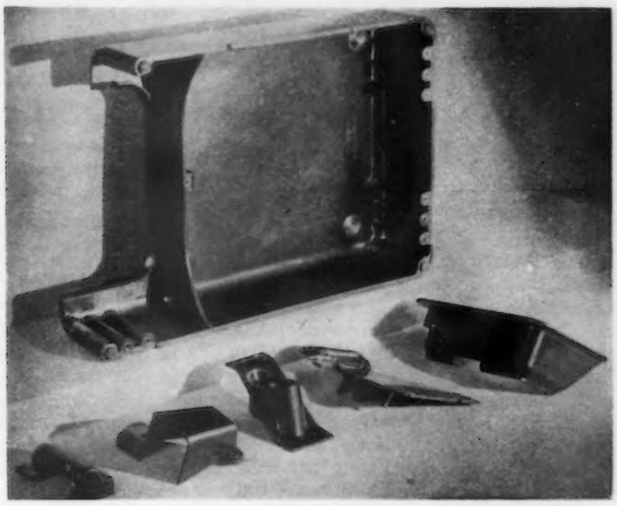
Expanding Outlets for Plastics

For some time the plastics industry has been busily engaged in the task of finding new outlets for its products. Says a prominent manufacturer in the industry: "The material is just now finding its larger market. It is destined to play an increasingly important part in building construction for wall paneling, elevator cabs, baseboards, office partitions, counters, doors, washroom partitions, store fronts and window sills.

"The great pressure under which these impregnated sheets are formed provides a permanent, scratch-resisting surface, impervious to acids, alkalis and alcohol and capable of withstanding hard usage. This makes them especially desirable for desk table tops, pianos, beds, dressers, and hotel furniture. Superseding hard rubber, phenolic materials of the compound group will eventually form the entire portable telephone instead of being used only in the speaking and listening pieces as at present.

"Phenolic plastics have revolutionized the packaging of goods in the drug, cosmetic and toiletry trade. Laboratory research is now making possible the molding of these materials into frames for dictating machines, typewriters, comptometers, cash registers and similar types of equipment. They have long been favored by the automobile people for timing gears as well as for trimmings. Truly, these molding materials lend themselves to almost unlimited applications."

Here, then, is an industry which is rapidly emerging from its initial development and already has attained sufficient proportions to command attention. Since accurate data regarding the scope of its business are not gathered through any regular channels, it is impossible to state accurately its annual volume of sales. Nevertheless, it is roughly estimated that in the five years prior to 1932 it did a gross business of $250,000,000, or an average of $50,000,000 a year. This statement takes on added significance when it is realized that the industry had a progressive growth during that period, at the end of which its yearly sales probably were above the 50 million dollar mark.



Molded plastic parts for industrial sewing machines.

Plastics is one of the few industries which have withstood the ravages of the depression unusually well. The plastics people sold more goods in 1930 than in 1929 and still more in 1931 than in 1930. It was not until the early part of this year that the dislocation of economic forces halted the upswing. Since the industry is in its adolescent period and has not attained mature growth, it is reasonable to expect it to recover relatively fast from the depression.

The metal-working industry will do well to make a three-fold examination of this newcomer. In the first place, it should realize that here is a competitor not to be underestimated, for it can make and is making many articles of plastic materials which formerly were made of steel, especially small stampings and molded articles, with the advantages of low price, lightness of weight, durability, and the elimination of many operations.

Secondly, equipment builders should investigate the plastics industry as an outlet for their products. The manufacture of molded and laminated plastics requires a considerable investment in machinery, mostly of a special nature, and the promising future of the industry warrants a greater degree of development and research work on the part of machinery builders than at present to meet these needs.

Finally, articles developed through the use of plastics often involve in their basic design the use of metal parts. Automobile ignition systems, for example, are now being manufactured with plastic parts, but in their production probably more metal than plastics is employed.

Rustless Steel Castings For Paper Industry

Proper heat treatment provides at least one means of assuring satisfactory performance of the rustless steels or nickel-chromium-iron alloys in sulphite service, according to G. L. Cox and F. L. LaQue of the development and research department of the International Nickel Co., Inc. This conclusion is based on a recently completed study of the probable causes of failure of six castings whose failures were in sharp contrast to the success of alloys of this type in industry.

The authors presented their findings in detail at a symposium on alloys and linings Feb. 13, at the Hotel Pennsylvania, New York, at a technical session, under the auspices of the engineering division of the Technical Association of the Pulp and Paper Industry.

An examination of the castings was made in the light of the findings of previous investigators of these alloys, especially in regard to the causes and remedies for intergranular corrosion which was found to be present in each case of failure. Particular attention was given to the beneficial effects of proper heat treatment, which were studied by heat treating experiments on specimens cut from one of the castings that had failed. By suitable heat treatment the resistance of this casting to intergranular attack was completely restored as determined by accelerated corrosion tests. Likewise, the resistance of the heat-treated specimens to such intergranular attack was again destroyed by improper heat treatment, suggesting that the lack of proper heat treatment was the cause of the failure of the casting.

Steps Taken in Making a Job Time Study

By G. J. STEGEMERTEN
Superintendent, Time Study Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

HERE is a detailed explanation of how a job time study is built up. It covers the procedure followed in Westinghouse plants. How the human equation is met in arriving at the leveling factor to establish the equitable rating for the average worker is treated at length, as are also the corrective factors to allow for the inevitable time losses that occur independently of the processing itself. The article is supplementary to one by the author that appeared in THE IRON AGE of Feb. 9, page 228, devoted to the aims and installing of a job time study. Not in a long time has so comprehensive an account of an important instrument of modern industrial management become available.

THE steps taken in making a job study are illustrated in Fig. 1, which show how a study on facing, pointing, turning and threading a copper stud will appear when completed.

The limited space provided on the form for describing the elementary operations calls for a familiarity with the work and for a nice choice of words on the part of the analyst. Each elementary operation must be clearly defined, which means using words and terms exactly descriptive, and they must preclude the possibility of ambiguity and confusion with other elementary operations which are only slightly different. The importance of this point might seem to justify revising the form to provide more space, but the form here illustrated has been used satisfactorily by the Westinghouse company, and the advantages to be gained by revising this particular feature would be more than offset by the disadvantages of less space for other features. Examples of poorly defined elementary operations with suggested better descriptions are as follows:

Poor Description	*Better Description*
Pick up part	Pick up small parts from table (½ lb.)
Get drill	Get 3/16-in. drill from tool room (distance 150 ft.)
Back off table	Back off table 3 in.
File	Ream two mounting holes with file
Drill hole	Drill hole ¼-in. in diameter by ¾-in. deep
Get wrench	Get S wrench from drawer
Tape leads	Tape two leads 3 in.
Go to drill press	Walk seven paces to drill prese
Turn turret	Turn turret, two positions

The watch is always read at the termination of the elementary operation. This is generally marked by a sound, or by a reversal of direction or some other decided change in the work of the operator. Occasionally it is difficult to find a natural division point between two elementary operations and one must be unusually careful to take his reading at the same point each time.

The position of the hand at the termination of each elementary operation is mentally noted and recorded, but this reading does not indicate elapsed time. Elapsed time is secured by subtracting successive readings, which is done after the observations have been completed. (Refer to the "T" columns in Fig. 1 for subtracted values or elapsed times.)

The hour-decimal watch illustrated in Fig. 4 and used by our company is read in ten-thousandths of an hour, or to four decimal places. It is not necessary, however, to record all four figures for every elementary operation, except when they are long enough to extend over one or more complete revolutions of the hand or at the termination of an elementary operation during which the hand passed zero. The time for actually writing down the figures is thus reduced to a minimum.

The way to record readings is illustrated in Fig. 1. The values in the vertical "R" columns are recorded watch readings. It will be noted that three and four figures are used only when the large hand of the watch has passed through zero, as was the case under elementary operations 6 and 10, line 1; elementary operations 4, 7 and 12, line 2; etc. It will be seen under elementary operation 9 in line 10 that the small hand of the watch has passed through 0.30, which is considered zero so far as the readings which follow are concerned.

After the sequence of elementary operations has been established according to the best arrangement, this sequence is insisted upon, because any departure from the regular order interferes with the recording of the readings and complicates the study in general. Sometimes, however, variations from the regular sequence are legitimate. These variations may be divided into four general classes:

Elementary operations performed out of regular order.
Elementary operations missed by the observer.
Elementary operations omitted by the operator.
Foreign elementary operations.

Frequently there are combinations of elementary operations that can be performed equally well in the reverse order from that which has been arbitrarily decided upon, and the operator may thoughtlessly or intentionally reverse the order. If this is not a chronic fault, it is better to record the variation than to interrupt the operator to call it to his attention.

When Operations Are Out of Order

The procedure for handling this situation is to draw a horizontal line through the middle of the space for the reading of the elementary operation which is being done out of order, record the reading at the beginning of the elementary operation (the same as the reading at the end of the preceding one) below the line, and enter the reading at the end of the elementary operation above the line. This must be done for each elementary operation which is done out of order and for the first one after the regular sequence is resumed.

Elementary operation 11, line 3, in Fig. 1, was performed out of order, having followed elementary operation 10 instead of the third repetition of elementary operation 5, which would have been the regular order. The reading for elementary operation 10 was repeated below the line in the space for elementary operation 11, and the normal reading for elementary operation 11 was placed above the line. This reading which also marks the beginning of elementary operation 5 was placed similarly below the line in elementary operation 5 space, and so on. The reading for elementary operation 12, the first after resuming the regular sequence, also indicates the beginning of elementary operation 1 on the next piece, at which point the normal procedure is again followed.

An elementary operation will seldom be omitted by an operator, and

when it does happen, it probably means that the elementary operation was not necessary on that particular piece. It is taken care of by merely drawing a horizontal line all the way across the column in the space where the reading would have gone, without recording any readings, but going on to the next elementary operation as if it had been performed.

When Readings Are Missed

The analyst should not miss or fail to record any watch readings, but sometimes his attention is momentarily distracted from his work or he relaxes his concentration, and before he realizes it, an elementary operation is completed, and the time for observing the watch reading has passed.

In a case of this kind, he indicates it as a missed reading. The common symbol for this is an M placed in the space where the reading should have gone as illustrated on line 5, under elementary operations 4, 5 and 6 and in line 14 under elementary operations 9 and 5 in Fig. 1.

When it is realized at the completion of a regular elementary operation that the operator is not performing the next elementary operation in the sequence, it should be decided whether or not a foreign one is being started. If it is, he will indicate the chronological position by placing a symbol after the reading for the regular elementary operation just completed.

Operations Foreign to Process

It has been found convenient to use as symbols letters of the alphabet placed in the upper part of the space for elapsed time. The foreign elementary operations are lettered in the order of their occurrence to correspond with the foreign-elementary symbols printed at the right-hand side of the observation sheet. The readings at the beginning and at the end of the foreign elementary operations are recorded below and above the horizontal line which divides the space for recording foreign-elementary operation readings. The reading below the line is the same as the reading for the last completed regular elementary operation.

While the foreign elementary operation is in progress, there is generally sufficient time to make a note of what the operator is doing. If the space provided for the description of the foreign elementary operation is not adequate, as many additional spaces as are necessary are used and the symbols for the spaces canceled.

FIG. 2

Performance Rating Table

SKILL			EFFORT		
0.15	A1	Super.	0.13	A1	Killing
0.13	A2		0.12	A2	
0.11	B1	Excellent	0.10	B1	Excellent
0.08	B2		0.08	B2	
0.06	C1	Good	0.05	C1	Good
0.03	C2		0.02	C2	
0	D	Av'ge	0	D	Av'ge
—0.05	E1	Fair	—0.04	E1	Fair
—0.10	E2		—0.08	E2	
—0.16	F1	Poor	—0.12	F1	Poor
—0.22	F2		—0.17	F2	

CONDITION			CONSISTENCY		
0.06	A	Ideal	0.04	A	Perfect
0.04	B	Excellent	0.03	B	Excellent
0.02	C	Good	0.01	C	Good
0	D	Av'ge	0	D	Av'ge
—0.03	E	Fair	—0.02	E	Fair
—0.07	F	Poor	—0.04	F	Poor

ALLOWANCES

Machine Handling	10%
Machine Feed	10%
Bench Work	15%

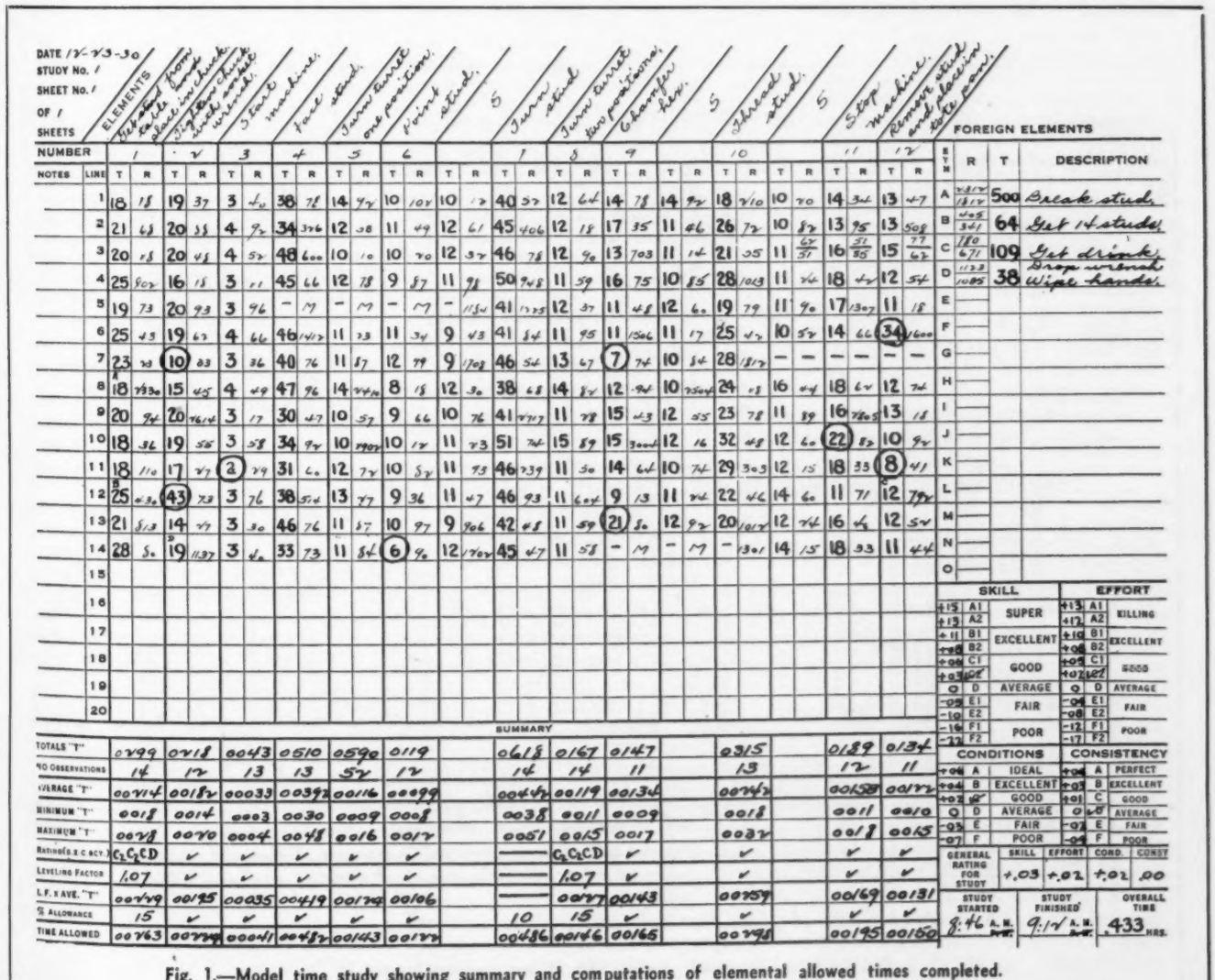


Fig. 1.—Model time study showing summary and computations of elemental allowed times completed.

The symbol for the next foreign elementary operation will be the one following the last canceled symbol.

In Fig. 1, foreign elementary operations B and C, which were performed between regular elementary operations, are recorded in this manner. Foreign elementary operation B was performed between regular elementary operation 12 on the eleventh piece and regular elementary operation 1 on the twelfth piece as indicated by the B recorded in the first column on line 12. Foreign elementary operation C was performed between regular elementary operations 11 and 12 on the twelfth piece as indicated by the C in the last column on line 12

When the foreign elementary operation occurs during a regular elementary operation, the point at which it occurs is indicated in the same way as described above by placing a reference symbol after the reading for the last completed elementary operation to correspond with the next available foreign-elementary operation symbol. The same procedure is followed as was just described, except that the reading below the line is not the same as the reading for the last completed regular elementary operation but is taken at the point where the regular elementary operation was interrupted. The reading at the end of the foreign elementary operation is recorded above the line. The regular elementary operation which was interrupted is again resumed, and the reading at its termination is recorded in its proper space.

In Fig. 1 on line 14 will be found an example of a foreign elementary operation occurring during a regular elementary operation. The operator completed elementary operation 1 and started on elementary operation 2, then interrupted himself, before completing elementary operation 2, to perform foreign elementary operation D, which he completed at 0.1123 as shown at the right-hand side of sheet before resuming elementary operation 2, which was finally completed at 0.1137 as recorded in the proper place.

Proper Number of Observations

The number of pieces to be observed is a matter which cannot be definitely fixed and which must be left largely to the judgment of the observer. This number will be influenced by the length of time required to do one piece and by the number of repetitive elementary operations in each cycle. For instance, an operation of 100 or more elementary operations of which a large percentage are repetitive need not be observed as many times as one of fewer non-repetitive elementary operations.

The study should be long enough to be representative of normal conditions. The greater the number of observations on each elementary operation, the more intelligently and accurately can inconsistencies be detected and the normal performance time determined. Beyond a certain point, however, the law of diminishing returns begins to operate, and the advantages do not increase in the same proportion as the time and effort expended in securing additional readings. Generally speaking, 15 or 20 observations are sufficient on operations of several minutes' duration.

The rating of skill and effort of the operator is noted in the space provided on the front of the sheet. (Refer to the check marks immediately preceding the comparative descriptions of skill, effort, and conditions in the table appearing in the lower right-hand corner of Fig. 1.) This must be done before leaving the scene of the work, while the performance of the operator is still fresh in the observer's mind. At this point, the judgment of the analyst must be at its best, for the calculations to determine standard time will be based up-

STUDY No. 1 DATE 12-23-30. OBSERVATION SHEET—W. E. & M. CO. W. E. & M. Co.—Works Dept. Form 3622-H

OPERATION Face, Point, Turn and Thread Short End of Stud.

DWG. X85792 SUB. 1

MOULD Forge DIE #56433 STYLE X84894 ITEM X

DEPARTMENT J-1 OPERATOR MAN NAME Domer No. X09

PATTERN INS. SPEC. L. SPEC. SUB.

PART DESCRIPTION Stud for Type X14-A Control Box. Hard drawn copper rod.

MATERIAL

EQUIPMENT #5 Warner and Swasey Turret Lathe.

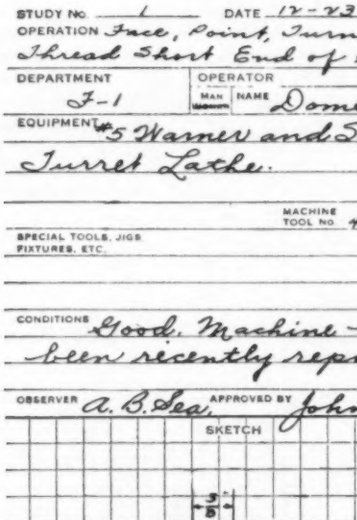
MACHINE TOOL NO. 4689

SPECIAL TOOLS, JIGS, FIXTURES, ETC.

CONDITIONS Good. Machine had been recently repaired.

OBSERVER A. B. Sea. APPROVED BY John Doe.

SKETCH



No.	ELEMENTS	SMALL TOOL NOS. FEED SPEED, DEPTH OF CUT, ETC	ELEMENTAL TIME ALLOWED (BOTTOM LINE OTHER SIDE)	OCCURRENCES PER PIECE OR CYCLE	TOTAL TIME ALLOWED
1	Get and place stud in chuck.				00763
2	Tighten chuck.				00274
3	Start machine.				00041
4	Face stud.	Forged tool.			00482
5	Turn turret - one position.		00143	4	00572
6	Point stud.	Box tool.			00172
7	Turn stud.	Box tool.			00486
8	Turn turret - two positions.				00146
9	Chamfer hex.	Forged tool			00165
10	Thread stud.	Die.			00798
11	Stop machine.				00195
12	Remove stud.				00150

TIME ALLOWED, SET UP EACH PIECE TOTAL .03787

REMARKS:

Due to turret construction, it takes no longer to turn turret two positions than it does to turn it one position.

Fig. 3.—Model time study showing back of sheet completely filled out.

on these ratings. Once these human factors are determined, almost all of the remainder of the work is mathematical.

Computing Elapsed Times

With the observations and the information recorded, the remainder of the work necessary to complete the study and to determine the allowed time for the job confines itself almost entirely to calculations and mathematical procedure. On the face of the observation sheet, as shown in Fig. 1, alternate columns headed with T will appear blank upon completion of the recording of the watch readings. The figures in the columns headed with R represent the watch readings which were recorded at the terminations of the elementary operations.

The first step of the computations is to determine elemental elapsed times by subtracting successive watch readings. These subtractions are recorded between the two watch readings that determine its value. Elapsed time is noted in ink both to insure a permanent record and to distinguish it from the watch readings.

Referring to Fig. 1, it will be noted that the first reading is 18, or to express the full decimal, 0.0018. The watch having been started at zero at the beginning of this elementary operation, the elapsed time will naturally be the same as the watch reading or 18 as recorded under T in column 1. Proceeding to elementary operation 2, it will be seen that the watch reading is 37. The elapsed time for elementary operation 2 is then the difference between 18 and 37, or 19, which is recorded under T in column 2. By continuing in this manner throughout the study, subtracting each reading from the succeeding one and recording the result between the two, the elapsed time for every occurrence of each elementary operation is readily determined.

Meeting the Irregularities

Those irregularities that called for special consideration when the observations were being recorded also demand somewhat of a variation from the usual method as just described when making the subtractions. Where a space contains two watch readings separated by a horizontal line, the elapsed time is determined by subtracting the lower reading from the upper one. This applies to foreign elementary operations as well as those appearing in the body of the study.

A horizontal line in a space without any watch readings indicates that the elementary operation was omitted by the operator. This elementary operation may be disregarded entirely. The elapsed time for the next completed elementary operation will be found by subtracting from the reading for this elementary operation the watch reading for the elementary operation which immediately preceded the one not performed.

An "M" indicates that the watch reading was missed by the observer. Obviously the elapsed time cannot be determined for the missed elementary

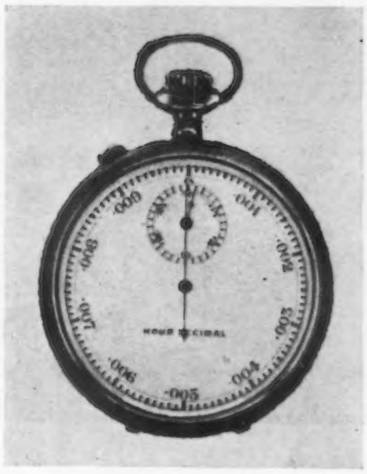


Fig. 4—Hour-decimal stop watch used by Westinghouse Electric & Mfg. Co.

operation nor for the one that follows it, so the corresponding spaces must be left blank.

When a letter indicating a foreign elementary operation is encountered the duplicate printed symbol in the first column under Foreign Elements on the right-hand side of the sheet should be referred to. The elapsed time of the foreign elementary operation will be found by subtracting the lower reading from the upper one, and this value deducted from the total elapsed time for the regular elementary operation will leave the net or correct duration.

In column 2 on line 14 in Fig. 1, a foreign elementary operation occurred. The total elapsed time for elementary operation 2 was the difference between 0.1080 and 0.1137, or 0.0057. But the D indicates that a foreign elementary operation must be deducted from this 0.0057. At the right under D, it is found that the foreign elementary operation was begun at 0.1085, the reading below the line, and ended at 0.1123, the reading above the line, giving an elapsed time of 0.0038. Deducting 0.0038 from 0.0057, the net or elapsed time for elementary operation 2 becomes 0.0019. This is recorded as shown.

Making Up the Summary

Before taking up the summary of the elapsed times, the study is carefully examined for abnormal values. If any are found, they are indicated so that they can be readily distinguished and excluded from the summary. A convenient method is to encircle them as shown in Fig. 1 under elementary operation 2 in lines 7 and 12. A value is regarded as abnormal when it is extremely high or low as compared to the majority of the other values for the same elementary operation.

No definite rule can be established for determining when values are abnormal, because the allowable variation from normal will vary with the length of the elementary operation. Picking out the abnormal values is largely a matter of judgment in which there is little likelihood of error, for extreme cases will be obvious at a glance, and doubtful cases will not show sufficient variations to change the result materially whether the values are admitted to the summary or not.

It is better to exclude only those values that are extreme and readily recognized as abnormal. If there are too many values discarded, the analyst throws himself open to the possible criticism that his study is not representative of conditions as they actually were when the observations were made. Low values are frequently caused by an elementary operation being only partially performed either due to neglect of the operator, or because the conditions of the material or some other feature of the job are unusually favorable for quick performance. High values are generally caused by some unusual difficulty, as a bad piece of material, or by some small foreign operation which escaped the notice of the observer and was not recorded.

After the abnormal values are eliminated, the next step is to count the number of occurrences for each elementary operation and record the number in the space provided under Summary at the bottom of the sheet. If more than one column has been used for an elementary operation, the values appearing in all of them are summarized together in the first column devoted to the elementary operation. This applies also to the recording of the number of occurrences. No summary will appear, then, in any of the columns to follow that have been used for the elementary operation in question, but instead of a summary, the elementary operation number appearing at the head of the summary coluum is shown. It is a simple matter to recognize repetitive elementary operations, provided the repetitions were designated at the time of observation by placing the number, which was first used to identify the elementary operation, at the tops of the columns devoted to the repeated elementary operations.

In determining the totals of the elapsed times for each elementary operation, the main point to watch is that all occurrences have been included in the total. The full decimal, to four places, is shown in this total, it being understood that the whole numbers expressing elapsed times indicate ten-thousandths of an hour.

The totals of the elemental elapsed times are divided by the number of occurrences. The results are the average elapsed times which may be taken to represent the performance level of the operator on that particular study. To these average elapsed times are applied the appropriate leveling factors in order to arrive at the leveled times.

For example, in Fig. 1, the total of the elapsed times for elementary operation 1 was 0.0299 hr. This divided by 14, the number of times that it

(*Concluded on Advertising Page* 16)

Cars Scrapped in Giant Baling Press, Melted in Huge Open-Hearth

ECONOMICAL scrapping and salvaging of derelict cars continue to loom as major problems of the automobile industry. Organized plans, conceived during the past few years by many manufacturers who have sought to deal effectively with these problems, have succeeded thus far in ridding the country's traffic lanes of about 300,000 obsolete and unsafe cars annually. A notable contribution to the industry's continued efforts to combat these difficulties is the recent installation of larger scrapping and salvaging facilities at the Ford Motor Co.'s Rouge plant at Dearborn, Mich.

In 1930 the Ford company put into operation at the plant its first large-scale scrapping program, which was described in THE IRON AGE of July 3, 1930. At that time the method, which provided for scrapping 375 cars each 16 hr., involved a dismantling line for old vehicles hauled in by "truck-away" by the company's dealers. All materials of salvaging value, such as glass, leather, tires, copper and lead, were removed. The chassis then was crushed under a 22-ton weight down to the seat level and the resulting wreckage charged into the Ford open-hearth furnaces. The charging mechanism had difficulty, however, in getting hold of such an irregular mass and depositing it in the furnace.

The present facilities, which can scrap 1000 cars a day (three 8-hr. shifts), have overcome that difficulty. With the recent installation of a 400-ton tilting-type, open-hearth furnace, hot metal mixers and a baling press, the wreckage now is crushed into compact bales 2½ ft. long, 6 ft. 2 in. wide, and 30 in. high, weighing up to 4000 lb. each. These bales are taken on metal trays hung on a monorail conveyor to the open-hearth furnace into which they are charged mechanically. After the bales have been melted at a temperature of 2800 deg. F., the hot metal is transferred in huge ladles to the adjacent 100-ton open-hearth furnaces where it is mixed with molten iron from the Ford blast furnaces and refined to the desired analysis.

Old cars are stored in an open lot adjacent to the open-hearth building and are hauled to the head of the dismantling line as needed. After all salvaged material has been removed from the old car as it travels along the conveyor, the stripped chassis rolls down an incline on its own wheels into the baling press, an 8-ton gate dropping into place behind it. The cast steel baling chamber is 17 ft. long, 6 ft. 2 in. wide, and 6 ft. 8 in. high. A horizontal ram, actuated hydraulically, crushes the car down to 30 in. under a pressure as high as 360 tons, although most light cars require only 50 tons. That is, the original 697 cu. ft. of space inside the chamber is reduced to 103 cu. ft., the pressure being exerted against the gate.

The vertical ram, weighing 17 tons, then starts downward with a pressure of 1025 tons, flattening light cars to a height of 20 in., and older and heavier cars and trucks to 30 in. Having accomplished its purpose, the ram recedes and the bale is held tightly between an ejector and bucker ram heads, which move out together at right angles to the machine axis, pushing the bale on to a waiting drag link conveyor suspended from an overhead monorail.

Hydraulic power for the baling press is supplied by an oil pump operated by two 300-hp., 720-r.p.m. synchronous motors. The horizontal and vertical rams are fitted with piston-type pullbacks, while the ejector and bucker rams are returned by counterweight. The entire baling press is controlled by one man from a remote control station and can handle a total of 1000 automobiles in three 8-hr. shifts.

When the baled scrap reaches the open-hearth floor, it is transferred au-

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THROUGH installation of a huge baling press and a 400-ton open-hearth furnace of the tilting type the Ford Motor Co. can scrap and melt 1000 cars a day (three 8-hr. shifts). After the car is crushed in the hydraulically-operated press, the baled scrap is heated to 2800 deg. F. in the large furnace and the hot metal transferred to adjacent furnaces for further refinement, being mixed with molten iron from the Ford blast furnaces. This process has increased the melting capacity of the open-hearth department 600 tons.

tomatically to an apron-type, inclined conveyor which discharges it into an open-hearth charging bucket. The 400-ton furnace is the largest open-hearth furnace ever constructed. Of the tilting type, it is mounted on three heavy box girders which in turn are supported by two cast steel rockers. The rockers are mounted on roller bearings supported by the roller stands, the design being similar to that used for many years on large hot metal mixers. The driving mechanism consists of two screw drives, interconnected. The tilting motors are two 110-hp., 425-r.p.m., direct current mill motors. The furnace tilts 35 deg. forward and 15 deg. backward.

The four furnace doors are unusually large, being 5 ft. 4 in. high and 8 ft. 3 in. wide, with water-cooled frames. The top of the frame is against the skewback, as no brick separates the door frame and the skewback on the charging sidewall. The skewbacks are cast steel, water cooled. Due to the extraordinary size of the doors, the door hoist units, operated by three 15-hp., 600-r.p.m. motors, are exceptionally large. Each unit has a crank on either end, a chain being provided between the crank and either end of the door. The length of the chain is equalized during the tilting process.

In addition to the electrical equipment for operating the tilting mechanism, there are two safety return air engines on the furnace which return the furnace to its normal position in the event of current failure at the time when steel is poured. Normally they are not in use. All gears and pinions are inclosed in housings which provide the necessary lubrication and exclude foreign matter from the gears and bearings. Each motor can be disconnected from the tilting mechanism by means of special flexible couplings. Supplementing the regular control of the mechanism by the operator, a so-called "dead man master control" returns the furnace to its normal position, if electric current is available, in case the operator leaves his stand at the controller.

Buckstays for the furnace are made of slabs of heavy section, those on the pouring side being 4 ft. long and 18 in. thick and those on the charging side 7½ ft. long and 20 in. thick. The furnace hearth is 17 x 48 ft. at the fore plate line, with a bath 51 in. deep at the furnace center. The overall length of the furnace, including the

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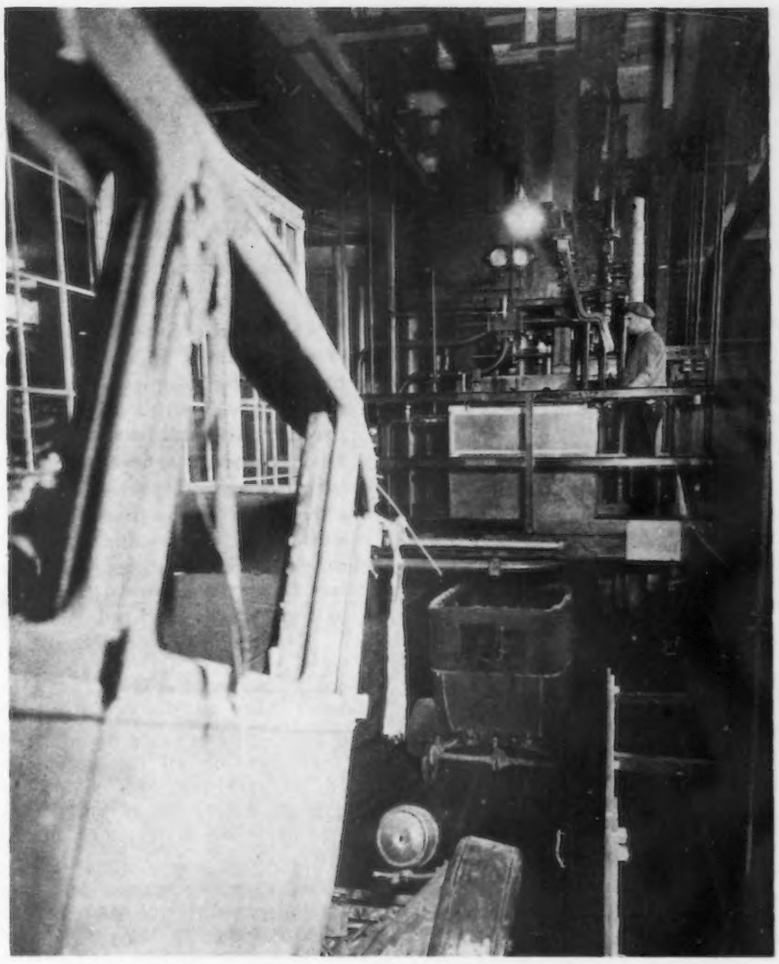
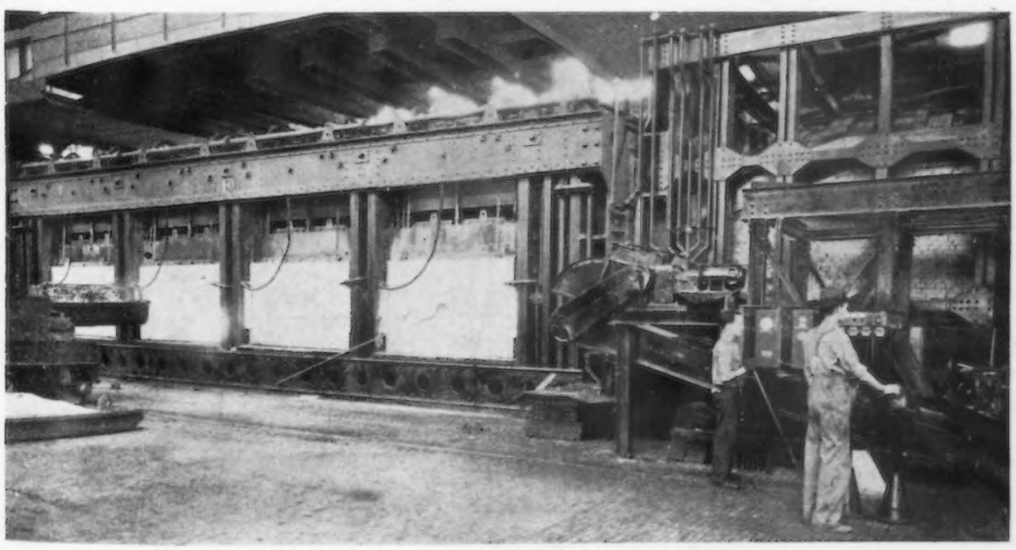


An old car, stripped of salvaged material, waiting in the baling chamber of the press for the 8-ton gate to drop in place behind it. The hydraulically-operated baling press crushes cars into a compact mass.



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SCRAPPED cars are melted at 2800 deg. F. in this 400-ton furnace. The hot metal then is transferred in huge ladles to adjacent open - hearth furnaces where it is mixed with molten iron from the Ford blast furnaces and refined to the desired analysis. Note the mechanical conveyor at the right which delivers the baled scrap to the open-hearth charger.

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What the Machine Has Done to Us

By WALTER S. GIELE

THIS is the fourth chapter of the author's factual presentation of the long-term relationships between employment, wages, productivity and mechanization. In this present article, Mr. Giele gives us an interpretation of the movements of the price level and shows the remarkable similarity of pre-war and post-war price trends of the present generation as compared with Civil War and Napoleonic War periods.

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QUOTING from Mitchell's "Business Cycles" (National Bureau of Economic Research), "the prices ruling at any moment for the infinite variety of commodities, services and rights which are being sold constitute a system in the full meaning of that term. That is, the prices paid for goods of all sorts are so related to each other as to make a regular and connected whole." This is a highly complex system of many parts connected with one another in divers ways, a system infinitely flexible in detail yet with a fairly stable equilibrium among its parts, a system like a living organism in its capacity to repair the serious disorders into which it recurrently falls.

"So much for the structure of the system of prices; concerning its functions in economic life a few words must be added. The system of prices is our mechanism for regulating the process of producing and distributing goods.

"The prices of the innumerable kinds of goods made and consumed in a business economy constitute an orderly system. The active agency in maintaining the relations among the various parts of this system is the quest for profit itself. Prices are the source from which family income is derived, and the means by which goods are obtained for family consumption; for both income and cost of living—the jaws of the vise in which the family feels itself squeezed —are aggregates of prices. Prices also render possible the rational control of economic activity in accounting; for accounting is based upon the plan of representing all the unlike commodities, services and rights with which an enterprise is concerned as buyer or seller in terms of a money price.

"That men like making and spending money as a way of organizing economic activity on the whole better than any other system they have yet practiced on a large scale, is indicated by history. The first section of this chapter suggests that the business economy grew out of the preferences of millions of men in successive generations in all quarters of the world. The medieval king and his tenants, the lord of the manor and his serfs, seem all to have gained by substituting monetary payments for the rendering of personal services. No one forced the housewife to give up making her own bread and her candles; no one forced the frontiersman to buy clothing in place of dressing in buckskin. It was because they preferred the new way of providing for their wants when the opportunity to choose was presented that consumers patronized the retail shops selling factory products. So, too, banking could develop only as great numbers of people year after year found it useful. Not that the growth of money economy has involved no coercion, loss and injustice—witness, for example, the tragic side of the enclosures which made possible farming for profit, the sufferings of peasants who could not learn the art of living on money, the oppression exercised by money lenders, and the tragic struggle of the hand loom weavers against the power loom. But, broadly speaking, it seems clear that this feature of culture could have attained such general acceptance by the most advanced peoples of the world after so thorough a trial only because it seemed to meet their needs more adequately than the other forms of economic organization with which they had had experience."

Thus it appears that prices are interwoven with all of the transactions that constitute our daily life and business. The price system is the only satisfactory system that we have been able to evolve and the means we employ to carry on the multitude of transactions of civilized life. It is the system which makes accounting possible. By means of prices we are able to establish balances between different kinds of commodities and of services. We are able also by means of the price system to compare relations among quantities of commodities and of services in any time period for which we have data with similar relations in any other time period for which we have comparable data.

The Data Available

What has already been said with reference to the complexity of interrelations among the parts within the price structure will indicate the difficulty of constructing a truly representative price series. The prices of all commodities do not change simultaneously nor do all commodities move upward or downward in unison. Price changes in commodities sold in large quantities affect the general price level more profoundly than do price changes in commodities sold in smaller quantities. The items going into the composite index number must therefore be weighted.

A considerable number of price se-

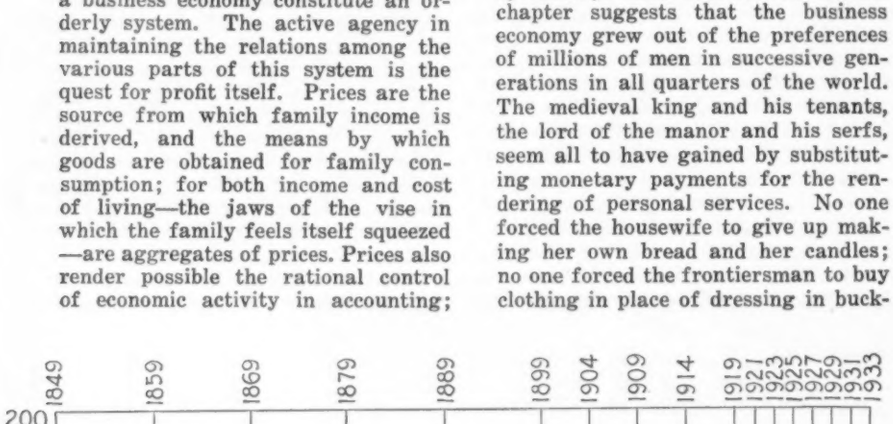


Chart 13—Wholesale Commodity Price Index by Years, 1849 to 1932, inclusive. (1926 equals 100)

ries has been computed, some for general and some for special purposes. The series of "index numbers of wholesale prices by years" constructed by the Bureau of Labor Statistics of the United States Department of Labor has been selected as best adapted for the purposes of the present analysis and is represented by Chart 13 and its accompanying table. This series may be found in the Commere Year Book for 1932 on pages 68, 76 and 78, and in the Statistical Abstract for 1932 on page 298. More complete data are available in the United States Bureau of Labor Statistics, Bulletin No. 543, where the index numbers may be found tabulated, beginning with 1801 and including 1930 on page 39, as Table 5. This page carries the following statement:

"The trend of wholesale prices in the United States since the beginning of the last century is shown by the figures in Table 5. The index numbers for the years 1801 to 1840 are arithmetic means of unweighted relative prices of commodities as published on pages 235 to 248 of Bulletin No. 367. The index numbers for 1841 to 1889 also are arithmetic averages of unweighted relative prices that have been taken from the report of the Committee on Finance of the United States Senate on wholesale prices, wages, and transportation, March 3, 1893. As originally published, these figures were computed with 1860 as the base year. They are here converted to the 1926 base. The prices used are in currency, and the number of commodities varies from approximately 150 in the earlier years to 250 in the later years of the period.

Figures Not Strictly Comparable

"The index numbers from 1890 to 1930 are the bureau's regular weighted series. In using the data in this table it should be borne in mind that the figures in the three series here joined are not strictly comparable, since they are based on different lists of commodities in different markets and are, moreover, unweighted for the years prior to 1890. They are believed, however, to reflect with a fair degree of accuracy wholesale price changes in general over the period stated."

Bulletin No. 543 gives also the individual average prices of the commodities included and, in an appendix, the quantities used as weights. Bureau of Labor Statistics Bulletin No. 493 describes methods used in collecting prices and computing the index numbers.

The census of manufactures was taken at various intervals of respectively ten, five and two years. None of these periods coincide with either the high or low points in the price series. For convenience of comparison, with any of the charts showing the data on manufactures, therefore, the wholesale price series has been replotted showing only the years in which the census of manufactures was taken, in supplementary chart No. 14.

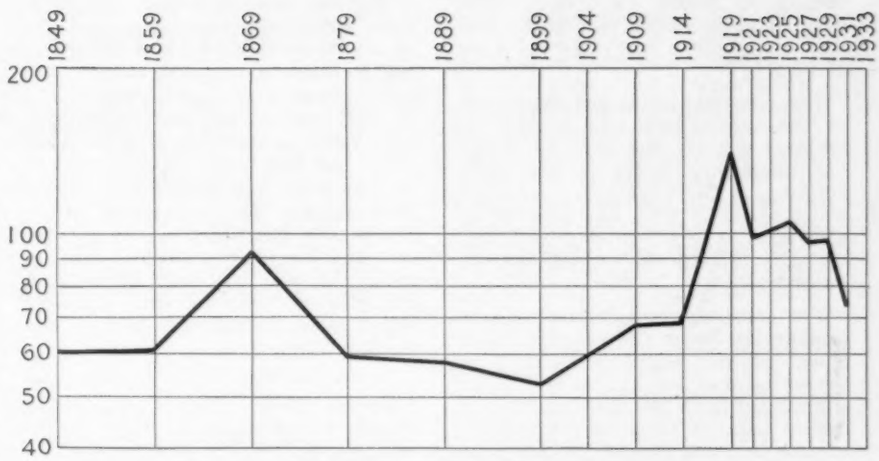


Chart 14—Wholesale Commodity Price Index Plotted by Census Periods Only. (For comparison with other census charts. 1926 equals 100.)

Detailed Study of the Wholesale Commodities Price Series

Beginning with a commodity price level represented by an index number of 60.1 (1926 equals 100) in 1849 we find that the relatively active business of the earlier fifties, in which the country's first railroad building boom was a factor, stimulated a moderate rise in prices until the panic of 1857 brought them back to the level with which we start the analysis and which was not materially changed until the outbreak of the Civil War.

The sudden demand for war materials coupled with the dislocation of labor and disruption of normal sources of supplies combined to send commodity prices soaring. They more than doubled in four years.

With the cessation of hostilities in 1865 came an almost immediate readjustment of prices and then began the long downward swing which was to continue as an underlying trend until 1896, 31 years later. The descent was at a comparatively rapid rate for the first six years. Nevertheless the recuperation from the war was rapid and business was active with full employment of labor at increased wages. Industry and transportation expanded on a large scale and the price decline was arrested.

In 1873, however, panic again hit the country and the commodity price level resumed its decline at approxi-

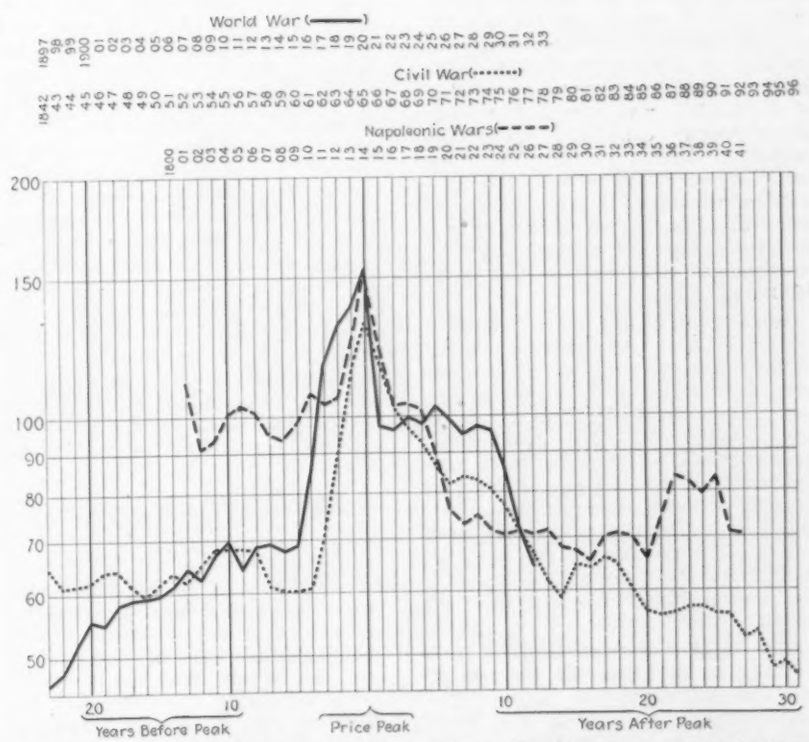


Chart 15—The Effect of Wars on Commodity Prices. (Solid line represents World War: dotted line represents Civil War, dash line represents Napoleonic Wars. (For comparison, price peaks of all three periods are made to coincide.)

mately its former rate, until 1879, when it again stood close to the pre-war level, which was also the level of 1849.

The recovery (from the depression of the 1870's) with its increase in business activity was reflected in rising commodity prices in the early eighties. The business recession which began in 1883 was reflected in a resumption of the price decline, followed in turn by the recovery of the latter eighties.

The pause in the decline left prices measurably below the pre-war levels when troubles began to multiply in the early nineties. Prices began to slip off and with the panic of 1893 to decline rapidly, reaching a low point of 46.5 in 1896, roughly 25 per cent below the pre-war level.

The significant indication of this 31-year post-war price decline would seem to be that prices followed rather than led business activity and that periods of high business activity and of "prosperity" are possible coincidentally with a basically declining trend in commodity prices. But during this 31-year period in which the commodity price index fell by nearly 90 points from its war peak of 132.0 to a low point 25 per cent below its pre-war value there were several periods of prosperity.

Colonel Ayres shows at least four such periods of considerable duration and extent not to count the lesser fluctuations separately.

In 1898 the war with Spain, with the buoyant effect of military successes, and a favorable agricultural situation reversed the basic price trend. The average recovery in commodity prices for the 18 years from 1897 to 1915 was at about the same rate as had been the average decline for the 19 years from 1877 to 1896, with the 1915 level very close to that of 1877. We have seen how periods of prosperity can exist within the period of decline in the underlying trend of commodity prices. We now see how periods of depression can exist within the period of rise in the underlying trend of commodity prices. Such periods occurred in 1904, 1908, 1911 and 1914.

With most of Europe involved in the World War and coming to us for munitions to be paid for with money borrowed from us the commodity price level shot upward at a rate at first even faster than that which marked the Civil War until our own entry. Then the rate of advance was slightly retarded, though the upward climb continued at a rapid pace until the peak was reached in 1920, 18 months after the armistice, at 167.2, the average for the year 1920 being 154.4.

The total rise from 69.6 in 1915 to 154.4 in 1920 was 122 per cent of the immediate pre-war figure. The corresponding Civil War rise from 61.3 in 1861 to 132.0 in 1865 was 115 per cent of the then immediate pre-war figure.

But the first post-war commodity price deflation beginning in 1920 was at a rate much more rapid than that which followed the Civil War. The abrupt drop from 154.4 in 1920 to 97.6 in 1921 was 82 per cent of the pre-war figure, achieved in a single year, while the drop from 132.0 in 1865 to 82.8 in 1871 was 80 per cent of the then pre-war figure, reached in six years. As has already been pointed out, the World War boom lasted on after the war was over, permitting the accumulation of a stock of goods which made the panic of 1921 a commodity panic.

It was at about this time that we began to realize our creditor position in international trade and to evolve the theory that this position made it necessary for us to finance the operations of our debtors. So year after year, we, as a creditor nation, maintained an export surplus by constantly mounting capital investments in the form of loans to debtors. Domestic trade was stimulated by the expansion of instalment selling. We were selling the goods by lending the buyers the money with which to pay for them.

By these means we succeeded in maintaining the price level within a total range of eight index numbers for nine years. By 1929 the bootstrap finally broke and the post-war deflation of commodities was resumed. The downward movement, though not quite so precipitate as the first plunge in 1921, was still at a rate more rapid than any part of the price decline following the Civil War. The end of 1932 marked a three-year decline from 96.5 in 1929 to 64.8 in 1932. This represents a loss of 33 per cent from the starting point (96.5) compared to a loss of 37 per cent from starting point (154.4 to 97.6) from 1920 to 1921.

The latest available figure at this writing is for January, 1933, at 62.6. The yearly average has not been as low as this since 1907, and although the average is still well above the 46.5 level of 1896 it is now substantially on a par with the pre-Civil War level of 61.3 and the 1849 level of 60.1. A percentage drop equivalent to the 31-year drop following the Civil War would carry the figures to 54.4. This latter figure is introduced for comparison only. There is no reason for believing either that it must be reached before prices can turn upward or that it could not be passed on the way down.

The Effect of Wars on Commodity Prices

It will be noted in the foregoing detailed analysis that the most violent price swings accompanied the great wars. A special study of the effect of the Napoleonic wars, of the Civil War, and the World War on commodity prices appears in the Commerce Year Book for 1932 at page 77. The chart there shown is here replotted on a logarithmic scale (to show more clearly the relative changes) as supplementary chart No. 15. The following is quoted from the Commerce Year Book:

"From a study of the broad sweeps of price trends connected with the Napoleonic wars, the Civil War and the World War, parallels in the price movement may be observed. Wholesale price indexes since 1791 are shown in the accompanying chart and table. Although price data are somewhat fragmentary for the early period of American independence, available evidence points to a sharp rise in price levels, especially from 1791 to 1801 and from 1808 to 1814. In the latter year, prices averaged 2.2 times as high as in 1791, and reached as high a point as any on record. The rise in prices in the five years from 1860 to 1865 (117 per cent) was nearly as large as the advance in the 21 years from 1791 to 1814, but as the level prevailing in 1860 was about 13 per cent lower than that of 1791, prices did not reach as high a peak in 1865 as in 1814. The character of the increases in prices connected with the World War period differed somewhat from that of the wars occurring during the 19th century. In 1914 prices were at about the level prevailing in 1791 and 1860, despite the fact that they had been advancing for 18 years prior to that time from the exceedingly low levels of 1897. Prices nearly doubled from 1914 to 1918. At their peak in 1920 they were at almost precisely the same level as in 1814."

The declines in prices which characterized the close of the great wars since 1791 were less similar than the increases during the wars. The variations may be observed in the chart. From 1814 to 1821 prices declined 53 per cent. An advance of about three per cent occurred from 1821 to 1822, but thereafter prices receded slowly to 1833. After 1830 no pronounced long-term trend in prices occurred until 1860, although several secondary price movements took place. From the Civil War peak of 1865 prices dropped sharply (37 per cent in six years) until 1871, when they continued slowly downward until 1896. Both after 1814 and 1865 no long upward trend in prices occurred until there had first been a price decline ranging from 60 to 70 per cent, from the post-war peak. In both instances 80 per cent of the long downward sweep in prices occurred within 14 years. Neither after the close of the Napoleonic wars nor after the Civil War did prices go much lower than the level prevailing at the outbreak of the war. The drop in prices from the 1920 peak after the World War was even more severe during the first year than it was during similar periods after the other great wars. The arrest of the fall in prices in July, 1921, after only 14 months, and the ensuing tendency for prices to rise slightly for the next four years did not follow the Napoleonic wars or the Civil War. In November, 1925, from a point 12 per

(*Concluded on Advertising Page* 18)

Dyeing Gives Aluminum a Color Finish

NEW process offers manufacturers of metal products a colorful material for small novelties and for ornamental metal work.

ATTRACTIVE, durable finishes have contributed much to the substitution of metals for other materials. Now a new finish for metal, obtained by dyeing the surface instead of coating it, has been perfected.

Although the process is exclusively for aluminum, its emergence from the laboratory stage into commercial use may indicate a trend toward color which will eventually be joined by other metals and alloys. Known as Alumilite, dyed-surface aluminum is the result of a process licensed by Aluminum Colors, Inc., Indianapolis. By means of this method, small metal products are being dyed after fabrication, and, in certain instances, sheets are dyed before being stamped.

Aluminum cooking utensils for home use have been manufactured in the vivid colors formerly obtainable only in high-quality vitreous enameled ware; an automobile manufacturer is investigating dyed aluminum for the trim on motor cars; a maker of store fronts is planning to use it in part for trim; and the colored metal is being considered for doors and other interior work in a New York office building. To the designer of modern decorative motifs, it suggests many striking color effects obtainable with the aid of the metal worker.

An Outgrowth of Deplating Process

Basically, the dyeing process is a development of the deplating or anodizing process applied to pure aluminum. Deplating has been used for oxidizing the surface of aluminum alloys, providing the final product with a permanent, corrosion - resistant finish of leaden hue, as in spandrels of the Koppers Building, Pittsburgh, and certain structures of Rockefeller Center, New York.

In the dyed-surface aluminum, the sheet or the completely fabricated product is immersed in a tank and electrolytically oxidized. From this bath it is transferred to a vat of dye, which penetrates the oxidized surface to depths varying from 0.0003 to 0.001 in., after which the sheet, or the fabricated article, may be polished and buffed to a high luster. Both organic and inorganic dyes are used, so that the basis of pigment applied may be varied to meet specific conditions.

Two Classes of Finish

The color process has been developed in two general classes of surface, listed by the licensing company as A and B grades. The treatment, however, may be varied slightly for each grade, to meet many specific qualities needed. Generally, it may be said that the A, or hard, finish has about twice the wear resistance of the B grade. This A finish is claimed to be several times longer wearing than a good lacquer or enamel film, and has an added advantage in not chipping or scaling, as it is an integral part of the metal itself.

The hard grade of finish may be applied in so-called "sun-fast" colors, which are resistant to sunlight, within certain limits. That is, it is said to be unaffected by ordinary exposure, but tests have indicated that a two-year period of severe exposure would be likely to bring about a noticeable difference in shade.

For many purposes, however, not so severe as uninterrupted outdoor exposure, the A grade in the sun-fast colors is considered satisfactory. For example, on fishing reels and other small metal products, which may be intermittently exposed to outdoor conditions, the colors have shown adequate service. The black, in this hard finish, is claimed to be unaffected by continued exposure, and is primarily the dyed surface considered for store fronts, automobile trim and other outdoor applications.

This A grade must be applied after the product is fabricated, for the glass-like surface does not permit of satisfactory drawing or bending. Even slight forming tends to cause microscopic fractures in the hard, lustrous surface, a result calculated to impair weather resistance.

The B grade, the "soft or drawn stock finish," offers wide use, although it is not recommended for special resistance to sunlight or weathering. It may, however, be bent and drawn to ordinary depths, such as are required in manufacture of screw caps for bottles, small ash or serving trays, and similar articles. Such drawing is limited as to severity, and there is a slight decrease of luster, avoided when the B grade of finish is applied to the manufactured product. It is claimed to be adequate in resistance and durability for use where the material is not directly exposed for extended periods to atmospheric or other severe conditions.

The usual practice, at the present stage of development, is to treat metal products after fabrication. For certain articles, such as cosmetic compacts, bracelets, small boxes or serving trays, a design may be applied by the use of a gilsonite composition, such as is used by metal etchers. Thus, the dye affects only exposed parts, so that, after processing, the

(*Concluded on Advertising Page* 18)

Small products dyed to various colors by Philip Sievering, Inc., New York. The goggle-frames are brown and about 5000 were finished for the United States Army. In the background, the jar with plaid design was coated with gilsonite prior to immersion in the dye, so that alternate checks show the white metal. Left of center is a curved razor-blade sharpener in the "A" or hard finish.

Leading Metallurgists Discuss Varied Steel Problems

PROFITABLE technical programs were conducted by the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers during its 142nd meeting in New York, Feb. 20 to 23. Four sessions were scheduled at which ten papers were read and discussed.

Besides these main sessions, there was one devoted to coal evaluation, blast furnaces and raw materials at which four papers were presented. All one day was taken up with a joint meeting of the Iron and Steel Division and the Institute of Metals Division at which a symposium on gases in metals was the feature. Seven leaders introduced the seven main topics.

One of the four main sessions was devoted to special irons and steels, another to molten steel problems, a third to physical properties of steel and the fourth to X-ray studies. The attendance was large and highly representative. Brief abstracts of some of the more important papers and of the discussions, which were liberal and quite valuable, are here given.

Precipitation Hardening of Copper Steels

A NEW contribution to the phenomena of precipitation hardening of certain metals and alloys was the paper, "The Precipitation Hardening of Copper Steels," by Cyril S. Smith and E. W. Palmer, Copper Alloys Research Laboratory, American Brass Co., Waterbury, Conn., at the session on special irons and steels.

The solubility of copper in iron is about 2 per cent at 843 deg. C. (eutectoid temperature) decreasing to about 0.5 per cent at 600 deg. C. and the alloys between these limits are therefore susceptible to precipitation hardening, say the authors. With most precipitation-hardening alloys it is necessary to quench from a high temperature to secure a supersaturated solid solution, but with copper steels quenching is unnecessary.

The 1 per cent copper steel of low-carbon content gives essentially the same results, whether quenched or cooled, packed in a heavy copper container. On furnace cooling at a rate of about 375 deg. C. per hr., slight hardening occurs, due to precipitation of some of the copper on cooling, although the final hardness after reheating at 500 deg. C. is unaffected. Slower rates of cooling cause hardening to a greater extent on cooling, and the hardness after the precipitation heat treatment decreases. But even after cooling at the very slow rate of 25 deg. C. per hr. there is still some copper remaining in solution that may be precipitated on later reheating.

The presence of carbon in the 1 per cent copper steels modifies the effect of cooling rate considerably. A 1 per cent copper steel of that type, cooled from 700 deg. C., shows practically no precipitation hardening on reheating, but at 750 deg. C. there is considerable, and at 800 deg. C. maximum effect. Samples of steels containing 1 per cent copper and 0.19 per cent carbon were normalized at 865 deg. C. and then reheated at temperatures between 450 and 600 deg. C. for various periods of time. At each temperature the hardness rises to a maximum and thereafter falls off gradually.

Reheating of cold-worked copper steels causes precipitation which neutralizes the effect of recrystallization, and the ductility increases very considerably without much change in the tensile strength and yield point. For example, 0.040-in. sheet steel containing 0.03 per cent carbon and 1 per cent copper, after normalizing and rolling to 50 per cent reduction, has a tensile strength of 113,500 lb. per sq. in. or an elongation of 1.8 per cent in 2 in. Reheating for four hours at 450 deg. C. raised the tensile strength to 114,800 lb. per sq. in. and the elongation to 12 per cent.

Exchange of Views

In the discussion which followed, Mr. Smith, one of the authors, who presented the paper, declared the handling of these steels to be simple—air cooling and reheating, or cooling to 500 deg. C. and holding, resulting in excellent properties. Additions of one of many elements to produce quaternary steels result in approximate increases of 20,000 lb. in the elastic limit. Precipitation is extremely simple. In production, the copper can be thrown in and the rolling is not difficult.

In explanation of the presence of a non-ferrous man as chairman, H. Foster Bain, who presided, of the Copper and Brass Research Association, New York, said that the association was interested in copper steels at low prices and having good properties. Researches are being conducted by it and the Anaconda Copper Mining Co.

On the subject of rolling these steels, Dr. C. H. Lorig, Battelle Memorial Institute, Columbus, Ohio, stated that there is usually a thin skin of copper below the steel which later melts and penetrates crystalline boundaries, causing poor surfaces and the semblance of cracks. Depth of penetration depends on time, amount of copper, temperature and carbon

F. M. BECKET
New President of the A.I.M. and M.E.

JOHN JOHNSTON
New Chairman, Iron and Steel Division

present. Additions of nickel or cobalt, preferably the former, nearly neutralize these effects. For 1 per cent copper about 0.20 to 0.30 per cent nickel is customary. Dr. H. W. Gillett testified that this phenomenon was a surface proposition and not red-shortness. Dr. F. N. Speller, National Tube Co., also testified that his company had rolled 200,000 tons of this steel in the last 10 years and that the actual checking was a small matter so far as the use of the steels was concerned.

Chilled Alloy Cast Iron

BY alloying a good base composition of chilled or white cast iron with essentially 4 to 6 per cent nickel and 1 to 2.5 per cent chromium (more definitely 4.5 Ni and 1.5 Cr), an extremely hard, tough, and strong, white or chilled cast iron has been applied for several years to industrial and mining services, in which its unusual properties have been confirmed by its capacity to deliver in many instances much better performance than plain chilled iron or other wear-resistant materials. The hardness of such a material can exceed 600 to 750 Brineli as against 380 to 530 for corresponding grades of plain chilled iron. The strength is approximately doubled and the toughness significantly increased.

These are some of the facts brought out in a paper, "An Improved Nickel-Chromium Hardened Chilled Cast Iron," by J. S. Vanick, development and research department, International Nickel Co., Inc., New York, which was also presented at this session. The properties claimed make this grade of alloy iron especially useful for applications requiring a high hardness for resistance to wear, abrasion, attrition, deformation and to some extent to high compressive loading and to corrosive action.

A wide variety of commercial castings is being successfully produced from this special alloy iron, says the author. They range in size from small-grain grinding plates or burrs through medium-sized castings, such as sand pumps, up to large, heavy castings, such as rolls for metal rolling or cement grinding.

The performance of the fully hardened alloyed nickel-chrome chilled rolls for rolling mills on the harder, tougher metals has been vastly superior to ordinary iron rolls and sometimes equal to hardened ground steel rolls, says Mr. Vanick, and naturally at considerably lower cost. Chilled wheels for street railroad, mine car and crane-wheel service have been produced with roughly 50 to 200 per cent more strength in the gray sections and with a tough chill hardness capable of multiplying the wear resistance several times. Castings for coal crushing, grinding mill liners, grinding balls and so on have been formed to outlast their plain chilled iron predecessors as much as six to one.

The full paper gives detailed data as to composition, commercial production and applications, the influence of auxiliary elements such as manganese, molybdenum, high-silicon content with a discussion of structure, fracture, machineability, corrosion resistance and cupola production.

G. B. WATERHOUSE
Howe Memorial Lecturer

Comments by Foundrymen

It was suggested, in the discussion, by Dr. J. T. Mackenzie, American Cast Iron Pipe Co., Birmingham, Ala., that vanadium is a powerful element to investigate, its use possibly reducing the total amount of alloy. The question of fluidity and shrinkage of such an alloy iron as the author's paper describes was also raised, as well as the handling of the chromium.

In reply Dr. Vanick stated that possibly vanadium would be useful, but other carbide-forming elements were not favored, partly because of their effect on the chill. As to chromium additions, low melting nickel pigs with additions of ferrochromium in the spout are favored. The introduction of Mayari pig iron or chromium briquets is practiced. Fluidity is easy to obtain, even for complicated castings. As to shrinkage, this iron has all the bad effects of white iron. It can be cast in green sand to produce a solid white iron.

GEORG MASING
Institute of Metals Lecturer

John Howe Hall, technical assistant to the president, Taylor-Wharton Steel & Iron Co., High Bridge, N. J., related that he had made fairly difficult castings of this iron with little trouble. There had been difficulty in avoiding chromium losses, however. He did not regard the resulting product as "tough" but usually very brittle. For pure abrasion he regarded the austenite steels as better and stated that hard surfacing had decided values.

Papers of no little practical value were on the program for the session devoted to physical properties of steel, —one on the medium-alloy chromium steels and one on the correlation of the hot-hardness of high-speed steels with cutting efficiency.

Low Alloy Chromium Steels

OF considerable interest to many classes of users of alloy and other steels was the paper on "Properties of Low-Carbon Medium-Chromium Steels of the Air-Hardening Type." The authors are E. C. Wright and P. F. Numma, metallurgists, National Tube Co., Elwood City, Pa.

The authors present the results of an investigation of a series of low-alloy steels, varying in chromium from 1 to 7 per cent and in carbon from 0.10 to 0.30 per cent. Four main series are considered having approximately 1, 3, 5 and 7 per cent chromium respectively in three groups of 0.10, 0.20 and 0.30 per cent carbon.

Some of the steels of this general class develop high tensile strengths upon receiving comparatively simple heat treatments, such as ordinary air cooling from appropriate temperatures with or without subsequent tempering treatments. Unusual toughness frequently accompanies these high strengths. Resistance to corrosion is also bestowed by the chromium content, which also increases the strength and oxidation at elevated temperatures. Good forging and fabricating properties also exist, which is attested to by the fact that several thousand tons of seamless tubing has been made in the past five years from steels of 0.10 to 0.25 per cent carbon and 5 per cent chromium.

Tables are included, giving the analysis of the various types of steels investigated as well as thermal analysis data and tensile and impact properties of chromium steels after various heat treatments. The results indicate that steels of desirable prop-

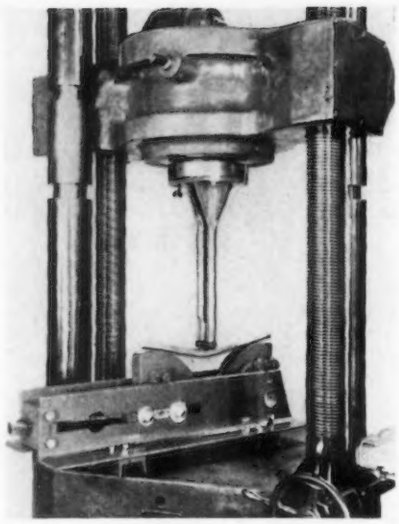
(*Concluded on Page* 383)

New Cold Bend Testing Device

BALDWIN-SOUTHWARK CORPN., Philadelphia, announce the addition to their wide line of materials testing equipment of the recently developed cold bend testing device, shown in the illustration. This device was developed by Prof. C. H. Scholer, Kansas State College of Agriculture, Manhattan, Kan.

The device is adaptable to any type of testing machine having facilities for compression testing. It consists of two cast iron segmental rollers of 6-in. radius mounted on hardened steel pins 2-in. in diameter. These are mounted in a frame of standard steel angles 4 in. by 6 in. by ⅜ in. One bearing is made adjustable so that the distance between rollers may be set to properly bend the bar to be tested. The end thrust of the movable roller is carried by a 1-in. steel screw which is also used to set the bearing in the proper position.

The upper edge of the frame is graduated in inches and a pointer on the bearing frame indicates the distance between the faces of the segmental rollers. This makes it a very simple matter to properly space the rollers for any size of bar and pin. The total weight of the device is 175 lb. Load is applied by a column consisting of two 1¼ in. diameter steel rods welded to a base plate which is fitted with clamps for attachment to the spherical head of the testing device. The other end of the rods are welded together with a fillet ¼ in. wide and the ends milled with a V-shaped groove to hold the hardened steel pins around which the bar is to be bent. Small pins rest in the groove as shown. Pins of larger diameter than those readily accepted by the column as shown are specially adapted. To bend a bar through 180 deg. requires a movement of 6 in. plus the diameter of the bar plus the radius of the pin. Bending will always start



Cold bend testing device for use on any machine having facilities for compression testing.

with a span of 12 in. plus the diameter of the pin plus twice the thickness of the bar. It is this long span which causes the bar to bend with relatively low loads. To bend a 1¼ in. round bar about a pin of its own diameter requires a load of 9600 lb., about one-third of that required by another commercial machine which was tested in comparison.

High-Lift Swinging-Boom Crane Truck

A RECENT development in the industrial power truck field is the high-lift swinging-boom crane truck illustrated, the boom of which is mounted on large diameter rollers so that it may be swung by hand 45 deg. either side of center; the crane has a capacity of 1200 lb. in any position. Due to the high lifting features of this crane the hook can be varied from a height of 33 in. to 102 in., depending on the overall truck height, the boom outreach remaining the same at all heights. This new crane truck is made by the Yale & Towne Mfg. Co., Philadelphia.

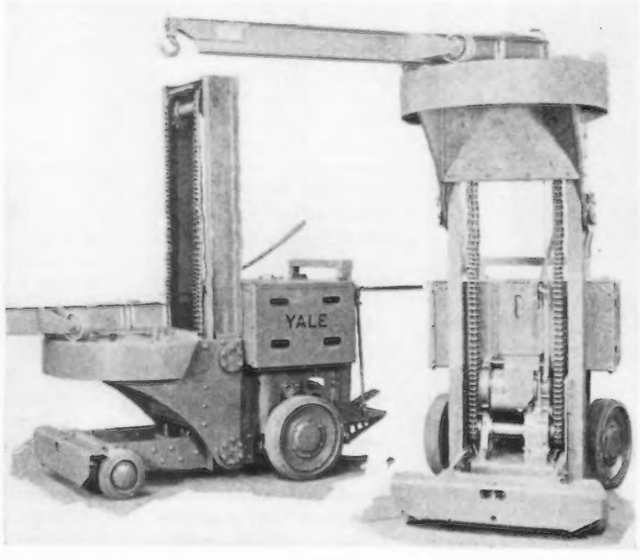
Two-Speed Hoist for Overhead Cranes

FOR installation, where headroom is limited and maximum lift is required, the Chisholm-Moore Hoist Corpn., Tonawanda, N. Y., is offering the drum hoist illustrated, which is a compact combination of its Cyclone wire rope hoist and a geared structural carriage for use on double I-beam, overhead traveling cranes.

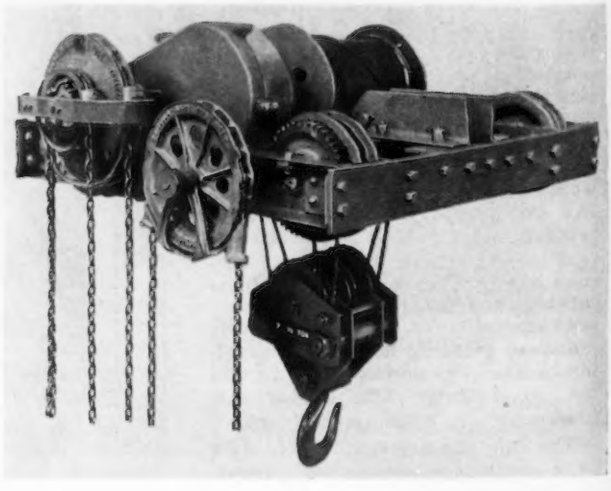
The hoisting unit is equipped with a dual chain sheave and two pendant hand chains. The larger sheave provides low speed ratio for capacity loads and the smaller sheave provides high speed ratio for light loads. Capacities range from 3 to 30 tons.

A Weston type load brake is employed. Fourteen ball and roller bearings are included in the hoisting mechanism, which hoisting mechanism operates in g r e a s e in an oil-tight housing. Alemite fittings are provided on the drum bearings and track wheels. Construction of the hoisting unit is the same as that of the Cyclone model K chain hoist. The driving mechanism contains eight ball bearings and four self-retaining roller bearings. Gyrating yokes assure smooth and safe operation. All gears have cut teeth and all mechanism operates in a bath of grease.

"The Valuation of Patents," a treatise by George Hart Morse, a Fellow of the American Institute of Electrical Engineers, deals with some general principles of the patent law, the relative desirability of various kinds of patents, and application of principles. The treatise is published in pamphlet form and is available at 25c. a copy from the author, P. O. Box No. 271, Washington.



THE combination two-speed hoist and geared carriage for overhead cranes is shown below. The boom of the high-lift truck pictured at left may be swung by hand 45 deg. either side of center.



Plain Hydraulic Grinder Features Ease of Control

THE LANDIS TOOL CO., Waynesboro, Pa., has added to its type C line of plain hydraulic grinding machines a 10-in. unit for grinding such parts as motor armatures, shafting, camshaft line bearings, and crankshaft line bearings of all shaft except the very large and heavy ones. As in the 6-in. unit previously described, ease of operation is obtained not only by smoothness of all machine movements but by so grouping all controls that only short, natural movements of the arm are required.

A large variety of parts may be ground on the standard machine and special attachments and tooling can be furnished to further increase the range of the production. The wheelbase or the headstock may be set at an angle. Crank heads can be furnished. Semi-automatic operation by means of foot pedal control can be arranged, as well as full automatic operation. Straight infeed grinding can be done, and also formed wheel and multiple-wheel grinding.

Control mechanisms, wheel drive, and the wheel spindle bearings and their oil pump are accessible for inspection or adjustment by the removal of single covers.

The hydraulic table - traversing mechanism is of twin-cylinder type. The volume of oil in the cylinders is constant regardless of the direction of traverse, resulting in unusual smoothness of operation. Table speeds range from 6 to 240 in. per min. The work carriage traverses on one flat and one V-guide. These guides have chilled surfaces and the guideways are flood lubricated by filtered oil from the same pump that furnishes pressure for the hydraulic system. The grinding wheel head is also supported by a flat and a V-guide having chilled surfaces. Its spindle is mounted in steel-back babbitt wheel-spindle bearings that are lubricated continuously. Sight-feed valves at the top of the base enable checking of the oil flow.

A 10-hp. motor drives the wheel spindle through multiple V-belts. Standard equipment includes a 30 x 3 x 12-in. straight-side grinding wheel. Oil and water pumps are mounted in line with each other as a single unit and are driven by 1-hp. constant-speed motor. The grinding wheel feed is of the conventional Landis type with final movement through a long screw and bronze half nut. Automatic hydraulic wheel-feed, which functions at each reversal of the table, can be supplied. The headstock is driven by a ½-hp. constant-speed motor; six work speeds are available by changing pulleys and belts.

The net weight of the 10 x 18-in. machine, without electric motors, is 6700 lb. and that of the 10 x 48-in. machine, 7700 lb.

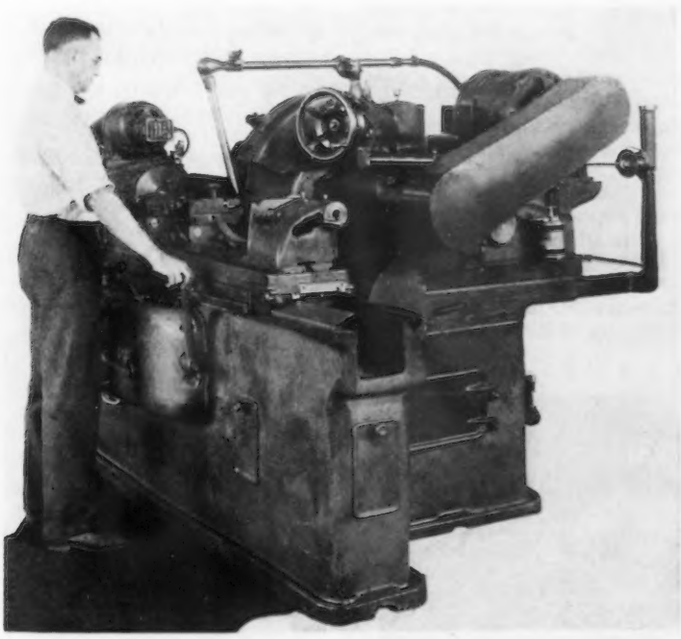
Special Swager Produces Optical Parts Rapidly

IN making nose-piece pad arm blanks on the special swaging machine illustrated, wire is taken from the coil, straightened, swaged and cut to length, the process being entirely automatic. Production is at the rate of 20 pins a minute. Wire up to 0.065 in. in diameter may be used and pins up to ¾-in. long produced.

The machine, built by the Langelier Mfg. Co., Providence, R. I., employs a No. 1 swaging head, which is mounted on one end of the frame as shown. The remainder of the top of the frame has a dovetail slide upon which the shearing, feeding and straightening heads are reciprocated by means of a double cam under the frame. The feeding and straightening heads are coupled together and act in unison.

The feeding mechanism is made up of a double cam that actuates a pair of cam levers connected to a pair of segment gears that mesh with racks located in the dovetail slide. One of the racks is connected with the feeding head and the other to a wire pinch-lever in the feeding head. The cams are driven by a worm and wheel. The swaging head and wormshaft may be driven either by a countershaft or a motor on the machine. The two paths of the double cam are the same excepting that an additional rise is given to one to actuate the wire pinch lever that grips the wire and feeds it ahead for each length of pin.

Shearing of the pins is accomplished after swaging by a pair of shearing bushings, one fixed in the shearing head and the other in the oscillating segment gear that is actuated by a cam in the worm wheel. An adjustable stop controls the length of wire to be fed forward at each cycle. The swaging head is adjustable axially, and controls the length of swaged section on the pin. The machine weighs about 900 lb., and requires floor space of 2 x 3 ft.



Motor armatures, shafting, camshaft and crankshaft line bearings are ground rapidly on this 10-in. machine. Controls are so grouped that only short natural movements of the arm are necessary.

In making the nose-piece pad arm blanks, wire is taken from a coil, straightened, swaged and cut to length.

Otis Steel Co. Defaults On Bond Interest

The Otis Steel Co., Cleveland, on Monday announced the formation of a bondholders' protective committee for its first mortgage 6 per cent sinking fund bonds, following the company's decision not to meet the interest payment due March 1, in order to conserve working capital. The bond issue aggregates $10,827,500 outstanding in the hands of the public and $6,155,000 pledged to secure indebtedness of $2,688,000.

President E. J. Kulas in a statement said that the interests of the company and the holders of all its securities are best protected by insuring the continuance of the company's operations, and by conserving its working capital the company should be able to continue its operations without interruption.

The company's cash position making default on bond interest advisable was due, he said, not only to the effect of the depression, but also to the recent erection of a continuous strip mill at a cost of about $5,000,000. It was expected that the cost of this mill would be financed from the sale of securities or from earnings, but neither was possible because of general conditions.

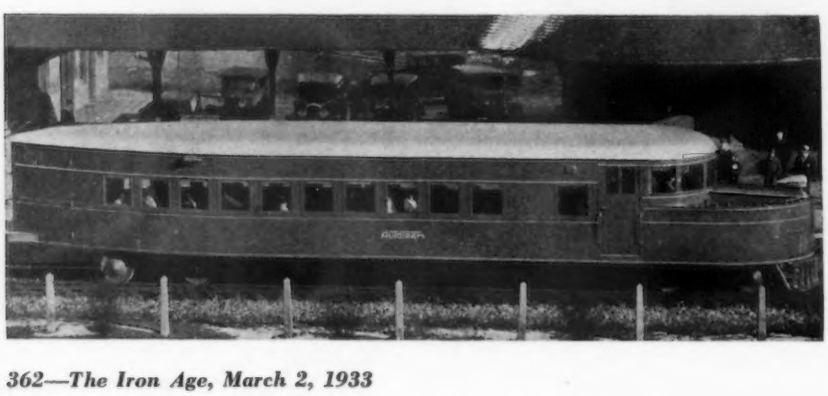
Railroad Motor Coach Constructed of Aluminum

The Autotram, a railroad motor coach recently built by the Clark Equipment Co., at Battle Creek, Mich., has a body of aluminum construction throughout. In most places, the aluminum alloy Duralumin is used, and all pieces are heat treated before use. Duralumin is not only light in weight but has the quality of yielding rather than shattering under shock.

The fabrication of the body utilizes a large number of sections, many standard and many special. These aluminum alloy structural members have the strength of mild steel although they are only one-third as heavy.

The body is of the center-sill type, having a strong beam under the floor extending from end to end to give strength longitudinally. While the Autotram is not intended to be operated in trains, it has the strength longitudinally to permit such use if desired.

The car is about 60 ft. long, is fully streamlined, is powered by a high-speed 160-hp., 16-cylinder gasoline engine of the V-type, and will have a maximum speed of 85 miles an hour. The weight of the vehicle empty but equipped for passenger service is 30,000 lb.; of this approximately 12,000 lb. represents various aluminum alloys. It is estimated that it would have weighed 52,000 to 55,000 lb. if built of ordinary car structural material.



Improves Steam Pumps for Handling Oil

An improved line of horizontal duplex steam pumps for handling cold or hot oils, gasoline and other petroleum products has been announced by the Worthington Pump & Machinery Corpn., Harrison, N. J. Built in three different types—valve plate, turret and pot valve—these units represent notable forward steps in pumps for oil service. Stainless-steel drop-forged valve service, as well as the submerged piston type of construction are provided on all models.

The valve plate type pumps have the discharge valves screwed into a common removable deck. Valve service is of the disk type and all pumps have the standard duplex steam end. For handling all cold oils up to 300 deg. F. and 5000 S. U. S. viscosity, units of this group are of all-iron construction with removable Ni-Resist cylinder liners. For hot oil service (above 350 deg.) these pumps have water-cooled stuffing boxes and either Wompco or cast-steel liquid ends, dependent upon the pressure. Cast-iron piston packing rings, divided piston rods (stainless steel on the liquid end) and bolted stuffing boxes and glands also feature the construction. Capacities vary from 40 to 320 gal. per min. (240 g.p.m. for hot oil) at pressures up to 150 lb. per sq. in.; and from 20 to 240 g.p.m. (160 g.p.m. for hot oil) for pressures up to 350 lb.

Turret-type pumps have the suction and discharge valve decks cast integral. Stuffing boxes are of the bolted type with bolted glands. The all-iron fitted turret-type pumps, with removable Ni-Resist liners, are available for cold oil service with capacities of 150 to 840 g.p.m. for pressures to 75 lb. per sq. in., and with capacities of 100 to 500 g.p.m. for pressures to 200 lb.

Pumps of the pot valve type come in two designs: For pressures up to 750 lb. per. sq. in. with capacities of 35 to 350 g.p.m. (240 g.p.m. for hot oil) they are fitted with poppet-type valve service and Wompco (500 lb.) or cast-steel (above 500 lb.) liquid ends having removable Ni-Resist liners. Suction and discharge valves (of the same size) are accessible through the same covers, the discharge valve seats being mounted in removable decks. For pressures to 500 lb. per sq. in. and capacities of 140 to 1800 g.p.m. (700 g.p.m. for hot oil), cylinders are of Wompco (300 lb.) or cast steel (above 300 lb.) with removable Ni-Resist liners.

Offers Course in Welding

For engineers using this period of lessened business activity to improve their knowledge of new developments, the John Huntington Polytechnic Institute, Cleveland, in cooperation with the Lincoln Electric Co., is offering another course in "Designing for Welded Construction." The course, which begins April 3, consists of a week of intensive work, six days being spent in the welding school of the Lincoln company, where instruction will be given in operation of the electric arc. Each evening a lecture on designing for arc welded construction will be given at John Huntington Institute.

Enrollment is limited to 30 men. Applicants should be college graduates in engineering or have equivalent practical experience. Further details may be secured from Alfred Mewett, dean of the Institute, or from E. W. P. Smith, consulting engineer, Box 683, Cleveland.

Total output of by-product and beehive coke in the United States in January, at 1,866,427 net tons, represented a decline of 0.8 per cent from the December production of 1,881,685 tons, and compares with 2,188,823 tons in January, 1932. By-product output in January amounted to 1,784,527 tons, compared with 1,786,085 tons in December, while beehive coke production was 81,900 tons, against 95,600 tons in December. Stocks of coke at by-product plants decreased 5.9 per cent in January and were at the lowest point since June 30, 1931.

The Dance of Death

ABORIGINAL, savage people are known to have been addicted to competitive self-torture. Worked into psychopathic frenzy by the beat of toms-toms, individuals in the Dance of Death vied with one another in inflicting punishment upon themselves that often resulted fatally.

"How silly!" we exclaim. "Civilized and intelligent people would never think of reverting to such practices."

But what about the equally futile and silly Dance of Death that has been going on and is now going on in industry under the leadership of the price cutters?

There is a difference, of course, between the old Dance of Death and the modern one. The aboriginal knife flourishers knew that they were mutilating themselves. The less intelligent but more modern wielder of the price knife thinks that he is mutilating the other fellow.

These foolish leaders of the modern Death Dance do not realize that they are initiating a frenzied competition in throat cutting in which it will be only a matter of moments before their own knives are seized by more powerful hands and presented to their own throats.

A large and powerful company which has reached the limits of its patience and endurance has about decided to attach the following statement to every quotation that it makes:

> *"Desiring to participate in such business as you have to place we hereby authorize you to revise this quotation to the basis of the lowest price which has been quoted by any of our competitors on this specification.*
>
> *"This is done with the full realization that with the present volume of business neither we nor any other steel company is making anywhere near its fixed charges, even on the basis of our original quotation."*

What would happen to the momentary advantage, if even such it can be called, of the price cutter, were other powerful concerns to adopt the same defensive policy? And what would happen to the industry?

Let this decisive threat be heeded lest it become a disastrous actuality. Stop the Dance of Death before the industry commits suicide.

... PERSONALS ...

C. H. CHAMPLAIN has been appointed general works manager of the Westinghouse Electric & Mfg. Co., East Pittsburgh. In his new position, Mr. Champlain will supervise the management and operation of all plants of the Westinghouse company, with which he began his career in 1898, as a machinist. Shortly after he went to work at East Pittsburgh he was made an assistant foreman, and in 1903 he became general foreman in charge of the manufacture of industrial and railway motors. For 12 years he had charge of various divisions of the works devoted to the manufacture of electrical equipment. In 1915 he was placed in charge of munitions manufacture at East Pittsburgh. Later he was transferred to East Springfield, Mass., where he was appointed general superintendent in charge of the production of rifles for the Russian government and later, when the United States entered the World War, of Browning machine guns. In 1919 he returned to East Pittsburgh as assistant works manager. Four years later he was sent to Sharon, Pa., where he built and organized a factory for the manufacture of transformers. This works is the largest factory in the world devoted to the manufacture of a single electrical product. After eight years at Sharon, he returned to East Pittsburgh as works manager, in which capacity he has served for two years.

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T. I. PHILLIPS has been appointed works manager at East Pittsburgh for the Westinghouse company, succeeding Mr. Champlain. Mr. Phillips was formerly works manager of the Nuttall plant of the company, and in addition to his new duties he remains in charge of the Nuttall plant in a supervisory capacity. W. OSWALD has been appointed superintendent of the plant. Mr. Phillips was born in London, England, later removing to Lynn, Mass., where he attended the public schools. From 1904 to 1908 he was employed as an apprentice in the West Lynn plant of the General Electric Co. Later he served as tool maker for several companies including the United Shoe Machinery Co., Mergenthaler Linotype Co., and the National Cash Register Co. In June, 1915, he joined the Westinghouse company. After a short time as foreman at the Chicopee Falls works, he was transferred to East Pittsburgh, where he served in the railroad department and the copper mills. Later he was general foreman in the tool department, assistant chief inspector at East Pittsburgh works and superintendent of the metal stamping department. In November, 1930, he went to the Nuttall plant as manager of the works department, where he has been stationed since.

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J. M. HIPPLE has been appointed general manager of merchandising engineering for the Westinghouse company, and will have charge of the appliance, motored appliance and refrigeration engineering departments as well as radio engineering at Chicopee Falls, Mass., works, small motor engineering at East Springfield, Mass., works, and industrial heating engineering at the Mansfield, Ohio, works. He was born at Jefferson, Ohio, and was graduated from the Ohio State University in 1898 with the degree of mechanical engineer in electrical engineering. He immediately entered the employ of the Westinghouse company and during the following year was engaged in the testing department. He was then assigned to the engineering department, where for one year he was engaged in work on designing transformers. From 1900 to 1911 Mr. Hipple worked on direct current motor design and in 1911 was made manager of the motor engineering department, in which capacity he had charge of the design for all industrial apparatus, including alternating-current motors, controllers, etc. In September, 1927, he was appointed East Pittsburgh works manager and held that position until his appointment as general works manager in June, 1931, which position he filled until his recent appointment.

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EDGAR WILSON, production engineer, associated with various Milwaukee industries for many years, has been appointed factory manager, Highway Trailer Co., Edgerton, Wis., at its plant in Stoughton, Wis. He succeeds JAMES HIGGINS.

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ALTON FARREL, who has been identified for the past 30 years with the Farrel-Birmingham Co., Ansonia, Conn., has resigned as treasurer and director because of illness. He is being succeeded by FREDERICK M. DREW, JR.

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COOLIDGE SHERMAN has been appointed assistant general sales manager of the Ludlum Steel Co., Watervliet, N. Y. He has held various positions in that company's sales organization since his graduation from Yale University in 1916, including his recent post of assistant to the president, and, prior to that, assistant manager of sales, and the Cleveland district sales manager.

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PAUL G. MYLER, president of the Canadian Westinghouse Co., Ltd., has been elected a director in the Westinghouse Air Brake Co., Wilmerding, and the Union Switch & Signal Co., Swissvale, Pa.

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RUDOLPH FURRER, formerly chief engineer and director of research for the A. O. Smith Corpn., Milwaukee, and also engineer for the Allis-Chalmers Mfg. Co., Milwaukee, has been appointed assistant to the operating vice-presidents of the National Tube Co., Pittsburgh, and will be engaged in further extending their research and engineering studies.

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W. C. HORR, of Cleveland, has been elected president of the Byers Machine Co., Ravenna, Ohio, succeeding the late W. C. Beckwith.

C. H. CHAMPLAIN

T. I. PHILLIPS

J. M. HIPPLE

T.C.I. & R. Takes Over Steel & Wire in South

The American Steel & Wire Co. has transferred its Southern plant at Fairfield, Ala., to the Tennessee Coal, Iron & Railroad Co., another subsidiary of the United States Steel Corpn. At the same time the Southern sales organization of American Steel & Wire was consolidated with that of the Tennessee Coal, Iron & Railroad Co., and hereafter the latter company will have complete supervision of the Southern market.

OFF THE ASSEMBLY LINE

Bank Troubles Affecting Sales Cause Motor Car Makers To Cut Schedules

DETROIT, Feb. 27.

CONTINUATION of the Michigan bank holiday and banking difficulties confronting other States have made motor car companies doubly cautious in scheduling production for March. Early indications were that March would be a relatively good month, but these estimates must be revised downward in view of the past week's developments. Retail car sales, with the exception of one or two popular makes, have virtually come to a halt in Michigan, in which last year 60,186 passenger cars were registered. Prospective buyers in neighboring States are holding back to see what will happen; in fact, this hesitancy on the part of the public to invest in automobiles extends into many sections of the country.

The edict of Governor Comstock declaring void all checks issued during the holiday or not cleared prior to it has added to the general confusion. Hundreds of small steel users throughout the State do not know where they stand financially until order emerges from the present chaos, and meanwhile steel mills are in a quandary about the advisability of shipping tonnages and thereby gambling on later collections. Equipment buying, already at a low point, has been dealt a body blow by the holiday, as companies which were considering expansion or replacement or even repair programs have indefinitely postponed action.

Chevrolet Slows Down

Originally intending to build 55,000 cars in February, Chevrolet assemblies slowed down the past week and the highest figure likely for February is 50,000. The March quota of 72,000 cars has been pared down to little more than 50,000. Chevrolet's gear and axle and forge plants last week reduced their operations to four days a week, a rate which will be continued the current week. It is understood that Chevrolet's production was speeded up during the recent labor disturbances at the Briggs and Hudson factories, with the result that the local plants now are three weeks ahead of assembly requirements. Chevrolet's Flint manufacturing plant, on the other hand, is continuing to run five days a week, but the assembly plant there, which supplies Michigan territory, is on an irregular schedule. Chevrolet is expected to make its initial purchases of steel for the second quarter sometime after March 6.

Ford Output Gaining

Pushing production upward as rapidly as possible to furnish dealers with adequate stocks, Ford has reached the 1000-car-a-day mark and is heading for a goal of 1600 a day during the coming month. Bodies are being received in larger quantities. For at least two days the past week they totaled 1500 to 1600 units daily. It now looks as though March output would be about 25,000 cars. Ford is giving small steel releases from day to day. Some departments at Dearborn, particularly the purchasing department, have been working shorthanded. Incidentally, there has been a considerable change in the personnel of the purchasing department in the last two weeks.

With so much emphasis on the V-eight, perhaps many people do not realize that Ford has not abandoned the four-cylinder car. The present 112-in. wheelbase car is available with either a V-eight or a four-cylinder motor, the latter being priced $50 under the former. This maintains the same differential in price which existed between model 18 (V-eight) and model B. The new four is identified as model 46, which likewise will be the label borne by the new Ford commercial cars.

There seems to be no hurry at Dearborn in getting the new small car (model 44) under way. Companies building equipment and fixtures for this job received hold-up orders recently which have not yet been countermanded. It is said that all machinery for building this car was to be installed in the Rouge plant by March 1, but at the present rate of progress it will be nearer April 1.

Dodge is making about 350 cars a day, four days a week, while Plymouth is reported to be assembling 1500 to 2000 cars a week. It is understood that Pontiac's schedule of 12,000 cars for March will be somewhat reduced. Willys-Overland's plant is still closed, except for production of trucks under the contract with International Harvester, and no date has been set for a reopening. Continental is gradually expanding its manufacture. Only the four-cylinder Beacon models have come off the assembly line thus far, but production of the six-cylinder cars should start early in March. Continental's operations were retarded for several weeks by a strike of employees of the Hayes Body Corpn., which furnishes all the bodies. Buick, Studebaker, Nash, Hupmobile and other medium-price companies are turning out cars at a comparatively slow pace, maintaining production closely in line with retail sales.

Chevrolet and Chrysler are inquiring for second-quarter steel, but are not expected to close contracts for about two weeks. These two inquiries should provide a test of the avowed intention of steel mills to stabilize prices.

Detroit Notes

It is believed that about 5,000,000 model T Fords are still being operated. Steel people attribute the long life of these cars partly to the fact that many vital parts were made of chrome vanadium steel . . . . Great Lakes Steel Corpn. continues to run three of its six open-hearth furnaces . . . . Plymouth has added a two-door sedan to its line, priced at $505 f.o.b. factory . . . . Hudson Motor Car Co. has reduced prices of the Hudson and Terraplane cars as much as $145, making the Terraplane the lowest priced eight . . . . During the bank holiday the Dow Chemical Co. at Midland, Mich., has issued coins made of Dowmetal valued at 20c. . . . . Ford is using soy oil in its foundry for core-making purposes, claiming it is more satisfactory than linseed oil and 25 per cent cheaper.

New Administration Must Plunge At Once Into Many Problems

Special Session of Congress Unquestionably Will Be Called to Consider Legislation Postponed From Lame Duck Session

By L. W. MOFFETT

WASHINGTON, Feb. 28—For the third time since the Civil War, a Democratic administration assumes control of the Federal Government on Saturday of the present week with unexampled burdens resting upon Franklin D. Roosevelt, the thirty-second President. A portion of the heavy load would have been lifted were it not for the refusal of an obstinate "lame duck" Congress to accept recommendations made by the retiring President, Herbert Hoover.

So it is that Mr. Roosevelt, his cabinet chosen, is about to plunge into the tremendous task that lies ahead. A special session of Congress will unquestionably be called on or about April 17. It will see an overwhelming Democratic majority in both branches. Majorities have a habit of dissolving into minorities, but not often to a serious extent in the honeymoon period of a new administration with a vast amount of patronage to be dispensed. Hence Mr. Roosevelt may be expected to inaugurate some of his program with a strong and effective hand.

Indications already appear that some features of the Roosevelt program may be disturbing, though as a whole it probably will be accepted as sound. The outstanding need is held to be the restoration of confidence so that business may move ahead with certainty, and this plainly is recognized by President-elect Roosevelt. And the aggressiveness with which Mr. Roosevelt has attacked the war debt problem, even before taking office, has been an element in giving confidence, not simply because it looks to an early settlement of this long-disturbing issue, but by reason of the virility with which Mr. Roosevelt is expected to act on other problems.

Manifestly, the program Mr. Roosevelt will lay out carries many features that were also contained in the Hoover program which has been so abruptly blocked. On the other hand, the Roosevelt program will contain proposals that contrast sharply with those of the Hoover administration.

Features of Roosevelt Program

Highlights of the Roosevelt policies may be safely ventured.

They cover war debts, tariff, cooperation with other world powers on economic questions; taxation in an effort to balance the budget; currency problems; coordination of transportation; farm legislation; building of a national banking system; possible extension of Federal control over public utilities, with actual Government ownership in some instances, such as Muscle Shoals; loosening of anti-trust acts, but with Government supervision and concessions to labor; reduction of governmental expenditures, partially through reorganization of departments and bureaus.

These constitute an enormous task, faced with many difficulties, some of which likely will not be overcome while others will require a long time for accomplishment.

With respect to war debts, apparently still more scaling will be exacted from the United States and settlements on a lump sum basis proposed. While opposition will develop in Congress, it is probable that such terms, if considered at all reasonable, would finally be accepted.

Tariff May Bring Controversy

The tariff problem no doubt will be the object of the usual bitter controversy. While Mr. Roosevelt has proposed so-called reciprocal trade agreements, it is clear that no industry stands ready to sacrifice its protection in return for any benefits that a foreign nation may grant to some other domestic industry. On the contrary, many industries are seeking greater protection from imports originating either in low-cost producing countries or countries with depreciated currencies, or both. Sharing in this move has been the steel industry. It joined with many other lines in a futile effort to have the previous and present sessions of Congress enact legislation to offset the effect of depreciated currencies. It is not believed the Roosevelt administration will attempt such legislation. It would arrive at the same result, however, if it were successful in its plan to bring about world-wide restoration of the gold standard. Such a development appears to be remote. Nor are trade reciprocal agreements an early prospect, if they can be made at all.

A general tariff legislation program may or may not be contemplated. The Democratic platform calls for a "competitive tariff for revenue," whatever that may mean. Democratic tariff programs in the past have meant tariff reductions and Mr. Roosevelt himself in his campaign seemed to enjoy ridiculing what he called the "Grundy" tariff. His Secretary of State, Senator Cordell Hull of Tennessee, whom his Democratic contemporaries call a tariff authority, is vigorously opposed to the Hawley-Smoot act and thinks high tariff barriers, as he calls them, should be lowered throughout the world, with the United States taking the leading role to set an "example." Even the only "old line" Republican member of the cabinet, William H. Woodin, who will have the important portfolio of Secretary of the Treasury, has criticised the American tariff as being too high. This prominent industrialist, best known as the president of the American Car & Foundry Co., incidentally will be the second prominent man connected with the iron and steel and metal-working trades to become head of the Treasury Department within the past decade. Andrew W. Mellon took up the same job just 12 years ago.

Industry Opposed to Reductions

But despite the position of the new cabinet with regard to the tariff, American industry generally is vigorously opposed to its reduction and, as it happens, some of the highest protectionists are included within the Democratic ranks in Congress when it comes to products of their own sections. But whether or not there is tariff legislation of a broad range the question will be a disturbing factor for business.

One of the greatest tasks before the new administration will rest directly upon the shoulders of Secretary of the Treasury Woodin. Balancing the budget in the face of a deficit that by the end of the present fiscal year will roll up to perhaps $2,000,000,000 is an enormous responsibility. There are many who do not think it is possible actually to balance the budget for several years even under the most favorable circumstances. One effort will be in the direction of cutting Government expenditures, but it may also be added that there is widespread doubt that Mr. Roosevelt can make good on his promise to cut Government costs by 25 per cent. New taxation of course will be resorted to, but evidently a general manufacturers sales tax will not be considered. Mr. Roosevelt is reported to be opposed to such a tax but rather to favor lowering the normal brackets and adding to others, already taxable.

Other problems facing Mr. Woodin of course are manifold, such as negotiating the war debt, refunding of the public debt and cooperation with the Reconstruction Finance Corporation, whose huge capitalization of $3,800,000,000 rests on the Treasury.

Roosevelt a Gold-Standard Man

Like Cleveland and Wilson, Mr. Roosevelt is a strong gold-standard Democrat and his cabinet is like-minded. Apparently Mr. Roosevelt is vigorously opposed to currency inflation and will depend upon credit expansion to increase prices. It is expected, too, that Secretary of State Hull will take quick action in prepar-

(*Concluded on Page* 382)

Period of Indecision in Major National Policies Approaching a Close

By DR. LIONEL D. EDIE

THE past ten months have been a period of indecision, of inability to make up our minds as a nation on certain major questions of national policy.

The country is not likely to drift much longer in this indecisive mood. The pace of events in the banking world forbids delay in crystallizing action.

The Plateau of Unused Opportunity

During the past ten months business and commodity prices have formed an approximate plateau. Wholesale commodity prices today average within one to three points of last summer's lows, depending upon the index employed. Two widely used indexes of the physical volume of production show, for the latest month and for the latest week, a level a few points above that of last summer's low.

This plateau had a speculative bulge in its contour last autumn. Business and prices both enjoyed a sharp seasonal advance at that time and subsequently lapsed into pronounced winter weakness. But essentially and fundamentally, the economic shelf gave the pattern for a broad ten-month period.

That was an interval of opportunity to decide great national economic policies in dealing with the depression, but unfortunately little advantage was taken of the opportunity.

Some Elements of Indecision

We launched the period with the principle of R.F.C. aid to crippled situations, but later became so skeptical of special aids that we yielded to the clamor for pitiless publicity of individual loans, and so weakened public confidence in the very institutions we were endeavoring to help.

We began the period with a policy of boldness and courage on the part of the Federal Reserve system but by January of 1933 we found the Federal Reserve partially reversing its policy by reducing its portfolio of Governments, and so leaving the public in doubt as to the future of monetary policy.

We began the period with official assurances of a balanced budget, but later the public discovered what careful students already knew, namely, that the knife had not been applied to unnecessary expenditures and with this discovery came doubt as to the good faith and capacity of any leadership to put Federal finances in sound condition.

We had assertions by responsible people that sound money was our fixed national policy, but we were running too much deficit to permit confidence in sound money and too little deficit to create real inflation.

We have had loud protests in high places against cancellation of war debts, but have witnessed negotiations under way which point in the direction of cancellation and as a nation we have very little notion as to where we shall finally land.

We have seen both political parties make broad promises of a national agricultural policy but the Lame Duck session of Congress has been debated away with agricultural policy not getting beyond the question mark stage.

We have swayed back and forth between ideas of nationalism and ideas of internationalism, between determination to rebuild and fortify our domestic market and inclination to await further cooperative effort in rebuilding world markets.

The Broad Significance of Decisions Now in the Making

In the broadest sense of the word, the significance of the immediate current period is that as a nation we are being forced to make up our minds upon our basic attitude toward the world-wide deflation and depression.

Our problem, in essence, is whether to resort to depreciation of specie or currency, or to expedite readjustment of individual debt structures to the changed level of prices and to readjust our whole economic system to the principles of an economy budget and "sound money."

The nation has been held in suspense on this vital decision. As time has gone on, this suspense has permitted the factors tending to undermine confidence to gain undue headway. The banking situation of the past two weeks has, in consequence, suffered certain adverse developments which are too well known to require description here.

The temptation, at a stage such as the present, is to adopt an unqualifiedly pessimistic attitude, but those who adopt such an attitude are likely to overlook the value of a crisis in bringing grave issues to a head. It is not unlikely that within the relatively near future we shall know which road we are taking as a nation of 122 million people. As soon as we know the road upon which we are to travel we shall doubtless witness some rapid strides in adapting our economic fortunes to the new certainties.

The recent trend of events increases the pressure upon the new administration to assume a role of outstanding strength and leadership.

Throughout the depression to date major action has been born of a series of crises. Unfortunately this appears to be the only force great enough to precipitate sharp decisions under our democratic form of government.

The point which observers should not overlook now is that the recent banking and budget crisis forces the country to end a period of great uncertainty and to commit its destinies one way or the other. Once that commitment has been made, the period of reconstruction can pursue its way.

Reading Iron Co. To Move Two Plants

The Reading Iron Co. has announced that two of its plants will be moved to Reading, Pa., at once as a measure of cost reduction and to give better service to customers.

The 18-in. bar mill, now at Danville, Pa., will become part of the equipment of the Oley Street mills in Reading, and all operations now carried on at Danville will be transferred to the Oley Street and the Ninth Street mills. For more than a generation, the Danville plant, designated as the Montour Rolling Mills, has been widely known for high-grade bar iron and Old Hickory staybolt iron, which is extensively used by the Reading and other railroads in locomotive maintenance.

The cut nail division, now at Pottstown, will also be transferred to Reading and located in the tube works.

Approximately 160 men will be affected by the transfer from Danville and some 50 men in Pottstown. These will be given first preference in employment when the mills are ready for operation in Reading.

The company plans to spend in the neighborhood of $160,000 in effecting these and other internal improvements. Preliminary work is now under way, and it is expected that both transfers will be completed within 60 days.

Iron and Steel Exports Gain; Scrap An Important Factor

WASHINGTON, Feb. 28—The highest since May of last year, exports of iron and steel in January, 1933, totaled 56,720 gross tons. As pointed out in THE IRON AGE of Feb. 23, imports in January declined to 21,892 gross tons, a drop of 7498 tons under those of December, 1932.

Exports of Iron and Steel from the United States
(In Gross Tons)

	January 1933	December 1932	January 1932
Pig iron	371	71	325
Ferromanganese	....	5	5
Scrap	31,813	30,148	7,572
Pig iron, ferroalloys and scrap	*32,184*	*30,224*	*7,902*
Ingots, blooms, billets, sheet bar	91	7	160
Skelp	157	167	1,056
Wire rods	711	1,103	1,108
Semi-finished steel	*959*	*1,277*	*2,324*
Steel bars	1,085	1,432	1,769
Alloy steel bars	30	74	45
Iron bars	23	29	30
Plates, iron and steel	340	710	1,045
Sheets, galvanized steel	2,452	1,510	2,605
Sheets, galvanized iron	35	88	139
Sheets, black steel	2,557	2,309	3,390
Sheets, black iron	123	76	175
Hoops, bands, strip steel	944	892	1,863
Tin plate; terne plate	4,433	4,118	5,311
Structural shapes, plain material	581	637	792
Structural material, fabricated	381	1,067	1,661
Tanks, steel	479	365	158
Steel rails	2,320	361	1,165
Rail fastenings, switches, frogs, etc.	385	136	348
Boiler tubes	302	300	222
Casing and oil-line pipe	1,161	501	1,177
Pipe, black and galvanized, welded steel	1,316	2,196	2,579
Pipe, black and galvanized, welded iron	77	213	75
Plain wire	390	731	698
Barbed wire and woven wire fencing	892	1,348	1,478
Wire cloth and screening	40	43	42
Wire rope	107	123	155
Wire nails	601	701	1,202
Other nails and tacks	215	311	298
Horseshoes	3	2	23
Bolts, nuts, rivets and washers, except track	185	307	225
Rolled and finished steel	*21,457*	*20,580*	*28,670*
Cast iron pipe and fittings	434	473	499
Malleable iron screwed fittings	112	136	117
Car wheels and axles	777	243	144
Iron castings	319	564	140
Steel castings	48	69	98
Forgings	203	226	478
Castings and forgings	*1,893*	*1,711*	*1,476*
All other	227	324	276
Total	56,720	54,116	40,648

Imports of Iron and Steel Products into the United States
(In Gross Tons)

	January 1933	December 1932	January 1932
Pig iron	6,444	14,244	9,369
Sponge iron	....	22	....
Ferromanganese*	3,556	999	1,559
Ferrochrome†	....	42	30
Ferrosilicon‡	4	5	8
Other ferroalloys	1	36	150
Scrap	212	....	411
Pig iron, ferroalloys and scrap	*10,217*	*15,348*	*11,527*
Steel ingots, blooms, billets, etc.	3	86	1,511
Wire rods	1,196	1,149	986
Semi-finished steel	*1,199*	*1,235*	*2,497*
Concrete reinforcement bars	266	905	3,428
Hollow steel bars	84	73	53
Merchant steel bars	1,664	1,711	3,817
Iron bars	16	44	18
Iron slabs	1	3	....
Boiler and other plate	40	1	30
Sheets, skelp and saw plate	1,237	1,262	260
Tin plate	19	1	50
Structural shapes	1,673	4,166	3,779
Sheet piling	....	....	....
Rails and rail fastenings	261	245	182
Welded pipe	280	361	404
Other pipe	77	130	202
Barbed wire	1,717	521	1,325
Round iron and steel wire	155	105	147
Flat wire and strip steel	65	91	71
Wire rope and strand	127	146	139
Other wire	225	123	84
Hoops and bands	1,445	1,777	2,034
Nails, tacks and staples	1,007	1,051	800
Bolts, nuts and rivets	20	26	18
Other finished steel	51	32	6
Rolled and finished steel	*10,370*	*12,774*	*16,847*
Cast iron pipe and fittings	54	....	11
Castings and forgings	52	33	171
Total	21,892	29,390	31,053

* Manganese content.
† Chromium content.
‡ Silicon content.

Gains were made in January exports over those of December in three classes, which overcame losses in 40 classes. One of the principal gains was in rails, which rose to 2320 tons, of which 1594 tons went to Newfoundland. Scrap exports increased to 31,813 tons, of which 22,614 tons went to Japan and 7563 tons to Italy. Galvanized steel sheets made a gain to 2452 tons, of which 1959 tons went to the Philippine Islands. Exports of black steel sheets totaled 2557 tons, of which 1380 tons went to France; 542 tons to Canada and 357 tons to China. Tin plate exports were 4433 tons, China taking 1251 tons; Japan, 1002 tons, and Hongkong, 914 tons.

Japan was the largest consumer of American exports in January, taking 24,662 tons, while Italy was the second largest user of American products, taking 7583 tons. In both cases the ranking position of these countries was due to the scrap movement.

United States Imports of Pig Iron
(In Gross Tons)

	Jan. 1933	Dec. 1932	Jan. 1932
India	3,209	1,435	3,551
United Kingdom	....	5,861	100
Germany	....	....	....
France	....	97	....
Netherlands	2,069	6,639	5,239
Sweden	....	114	98
Norway	....	....	....
Canada	162	....	....
Belgium	....	....	200
All others	*1,004	98	181
Total	6,444	14,244	9,369

* Imported from Kwantung.

Sources of American Imports of Iron Ore
(In Gross Tons)

	Jan. 1933	Dec. 1932	Jan. 1932
Chile	....	....	45,276
Cuba	150	....	22,000
Spain	....	....	....
Sweden	....	....	....
French Africa	....	....	....
Canada	....	....	38
Russia	6,800	7,970	7,300
Other countries	*7,134	166	14,517
Total	14,084	8,136	89,131

* 6950 tons from Norway.

Bar Iron Wage Scale Up

An increase of 5c. a 100 lb. in the price of bar iron during January and February is indicated by the bimonthly examination of the books of mills working in agreement with the Amalgamated Association of Iron, Steel and Tin Workers and the Western Bar Iron Association. Wages during the March-April period will thus be based on a sale price of 1.50c. a lb.

A valuable chart has been issued by the Baldt Anchor, Chain & Forge Corpn., Chester, Pa. It gives comparative properties of some heat and corrosion resisting metals and alloys. There are 26 materials including many of the chromium irons and the chrome-nickel alloys as well as nitralloy, some S.A.E. steels, monel metal and so on. Properties at room temperatures as well as the average coefficient of expansion are included.

SUMMARY OF THE WEEK'S BUSINESS

Steel Orders and Production Drop; Banking Situation Marked Factor

Miscellaneous Business as Well as Automobile Specifications Affected —Price Stabilization Proceeds Slowly—Scrap Steady

A RATHER sharp falling off in the volume of steel business, which is generally ascribed to the banking situation, has reduced the average rate of ingot output in the country at large to 17 per cent of capacity, with the possibility that a further slight decline in operations may occur before the end of the week.

At Cleveland, where automobile tonnage is an important factor, the sharpest drop has occurred, from 35 per cent last week to 23 per cent. Only in the Wheeling district, which has been aided by a fairly steady volume of tin plate specifications, and at Birmingham are operations holding at the level of recent weeks. Chicago production is off two points to 16 per cent, while in the Valleys the rate is 15 per cent against 17 per cent last week and 20 per cent during the preceding few weeks. The Pittsburgh district rate has also declined to 15 per cent from 16 per cent last week.

In sections of the country where banking troubles have been most marked, such as Michigan and Ohio, industrial plants are having difficulty in obtaining sufficient cash to meet payrolls and other running expenses, and as a consequence have restricted their steel orders to the barest minimum. Hundreds of the smaller banks in Michigan, being unable to withdraw money from Detroit banks, have remained closed, and thus in effect the Michigan bank holiday is continuing.

The sentimental effect of the banking situation on steel business has been acutely felt in districts where there are no serious bank difficulties, such as New York, where steel orders, except for tin plate, have dropped almost to the vanishing point.

EVEN with the curtailment of the past week, steel production in February probably has shown a slight gain over that of January on a daily basis, but March, which in normal years is one of the best months of the year for the steel industry, shows no marked promise. A resumption of the moderate upward trend of January and early February is scarcely to be expected until confidence has been restored. For this the steel industry is looking hopefully to the new Federal administration, which takes office Saturday.

The automobile industry, which weathered the first week or so of the Michigan bank holiday without appreciable change in its production schedules, is now proceeding more cautiously because of the effect which the situation has had upon retail sales of cars. Except for the Ford Motor Co., which has pushed output up to 1000 cars a day, with a goal of 1600 to be reached some time this month, motor car makers are revising schedules downward. Chevrolet has reduced work in its gear and axle plants to four days a week, and its March quota of 72,000 cars has been pared down to little more than 50,000, or approximately its February total. Some steel mills now have very small backlogs of automobile orders. However, Chevrolet and Chrysler have asked for second quarter prices and may close contracts within two weeks.

Meanwhile, the long-expected aid from the railroads has failed to materialize even to the extent of inquiries. Bookings of fabricated structural steel for building work totaled 16,300 tons in the week, but spans for the approach to the Golden Gate bridge at San Francisco account for more than half of this total. Interest is centered in the bids now being taken on about 100,000 tons of steel for the San Francisco-Oakland bridge.

PRICE stabilization efforts are proceeding slowly. No announcement has been issued as to second-quarter prices for sheets, but one is expected within a few days. Moderate advances may be put into effect on grades that have suffered the most severely in recent declines. New prices are being quoted on concrete reinforcing bars, which are higher than recent minimum levels, but below those nominally quoted as representative of the market. On mill lengths the new quotation is 1.40c., Pittsburgh, Chicago and Buffalo, while 1.45c. is named for Cleveland and 1.55c. for Detroit. The Eastern market on plates is still subject to sharp concessions on the more attractive orders, 1.40c. a lb., Coatesville, having become quite common on the ordinary run of business.

Despite the decline in steel production, scrap markets are generally fairly firm, a situation that in the Eastern section of the country is largely due to the demand for scrap for export, particularly to Japan and Italy. The scrap trade is now concerned as to whether the United States will follow Great Britain in establishing an embargo on shipments of munitions to Japan and China, and, if so, whether such an embargo would embrace all war materials, in which case scrap exports probably would be affected. January exports of scrap to Japan constituted almost 40 per cent of all of the American iron and steel exports in that month, and the February movement may have been an even larger proportion.

THE IRON AGE composite prices are unchanged at 1.923c. a lb. for finished steel, $13.56 a gross ton for pig iron and $6.83 a gross ton for heavy melting scrap.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Feb. 28, 1933	Feb. 21, 1933	Jan. 31, 1933	Mar. 1, 1932
No. 2 fdy., Philadelphia	$13.34	$13.34	$13.34	$15.64
No. 2, Valley furnace	14.50	14.50	14.50	15.00
No. 2 Southern, Cin'ti	13.82	13.82	13.82	13.82
No. 2, Birmingham	11.00	11.00	11.00	11.00
No. 2 foundry, Chicago*	15.50	15.50	15.50	16.50
Basic, del'd eastern Pa	13.50	13.50	13.50	16.00
Basic, Valley furnace	13.50	13.50	13.50	14.50
Valley Bessemer, del'd P'gh	16.89	16.89	16.89	17.39
Malleable, Chicago*	15.50	15.50	15.50	16.50
Malleable, Valley	14.50	14.50	14.50	15.50
L. S. charcoal, Chicago	23.17	23.17	23.17	23.17
Ferromanganese, seab'd carlots	†68.00	68.00	68.00	75.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Contract price; spot quotation $61.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$40.00	$40.00	$40.00	$43.00
Light rails at mill	30.00	30.00	30.00	34.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.50

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.50
Bars, Chicago	1.70	1.70	1.70	1.60
Bars, Cleveland	1.65	1.65	1.65	1.65
Bars, New York	1.95	1.95	1.95	1.85
Tank plates, Pittsburgh	1.60	1.60	1.60	1.50
Tank plates, Chicago	1.70	1.70	1.70	1.60
Tank plates, New York	1.698	1.698	1.698	1.798
Structural shapes, P'gh	1.60	1.60	1.60	1.50
Structural shapes, Chicago	1.70	1.70	1.70	1.60
Structural shapes, New York	1.86775	1.86775	1.86775	1.76775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.00
Hot-rolled strips, Pittsburgh	1.45	1.45	1.45	1.40
Cold-rolled strips, Pittsburgh	1.80	1.80	1.80	1.90

Finished Steel

Per Lb. to Large Buyers:	Feb. 28, 1933 Cents	Feb. 21, 1933 Cents	Jan. 31, 1933 Cents	Mar. 1, 1932 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.00	2.00	2.00	2.15
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.00	2.00	2.10	2.30
Sheets, galv., No. 24, P'gh	2.50	2.50	2.50	2.75
Sheets, galv., No. 24, Chicago dist. mill	2.50	2.50	2.60	2.85
Hot-rolled sheets, No. 10, P'gh	1.45	1.45	1.45	1.60
Hot-rolled sheets, No. 10, Chicago dist. mill	1.55	1.55	1.55	1.70
Wire nails, Pittsburgh	1.85	1.85	1.80	1.95
Wire nails, Chicago dist. mill	1.90	1.90	1.85	2.00
Plain wire, Pittsburgh	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., P'gh	2.35	2.35	2.60	2.60
Barbed wire, galv., Chicago dist. mill	2.40	2.40	2.65	2.65
Tin plate, 100 lb. box, P'gh	$4.25	$4.25	$4.25	$4.75

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	$8.50	$8.50	$8.25	$10.25
Heavy melting steel, Phila	6.75	6.75	6.75	7.37½
Heavy melting steel, Ch'go	5.25	5.25	5.25	7.12½
Carwheels, Chicago	8.00	8.00	7.50	7.25
Carwheels, Philadelphia	8.00	8.00	8.00	10.50
No. 1 cast, Pittsburgh	9.00	9.00	9.00	9.75
No. 1 cast, Philadelphia	8.00	8.00	8.00	10.00
No. 1 cast, Ch'go (net ton)	6.25	6.25	6.25	7.50
No. 1 RR. wrot., Phila	7.50	7.50	7.50	8.50
No. 1 RR. wrot., Ch'go (net)	4.50	4.50	4.50	6.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$1.75	$1.75	$1.75	$2.25
Foundry coke, prompt	2.50	2.50	2.50	3.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	4.75	4.75	4.75	5.50
Lake copper, New York	5.00	5.00	5.00	6.12½
Tin (Straits), New York	*23.20*	23.45	23.50	21.90
Zinc, East St. Louis	**2.67½**	2.60	2.87½	2.75
Zinc, New York	**3.04½**	2.97	3.24½	3.12
Lead, St. Louis	2.87½	2.87½	2.87½	3.05
Lead, New York	3.00	3.00	3.00	3.30
Antimony (Asiatic), N. Y.	5.62½	5.62½	5.80	6.37½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Feb. 28, 1933	1.923c. a Lb.	$13.56 a Gross Ton	$6.83 a Gross Ton
One week ago	1.923c.	13.56	6.83
One month ago	1.923c.	13.56	6.83
One year ago	1.926c.	14.47	8.25
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1932	1.977c., Oct. 4	1.926c., Feb. 2	$14.81, Jan. 5	$13.56, Dec. 6	$8.50, Jan. 12	$6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Steel Orders and Production Have Declined

Ingot Output Down to 15 Per Cent There and in the Valleys—Wheeling Rate Maintained—Prices Firmer

PITTSBURGH, Feb. 28.—Improvement in local steel orders, which was checked a fortnight ago, has now turned into a definite falling off in buying. Specifications for practically all finished products have declined in the last week, and production schedules have been reduced at many plants. The most noticeable decline has been in the requirements of small miscellaneous users, although the automotive industry is also reducing its takings.

Orders for structural steel and reinforcing bars are light, with the lack of small and medium-sized orders particularly noticeable. Interest is centered in the award of the San Francisco-Oakland bridge, on which bids will be closed next week. The contracts to be let at this time call for at least 100,000 tons of structural steel. A local mill has taken an order for 2000 tons of line pipe for delivery in the Southwest.

Otherwise, outstanding projects are lacking, and the industry is forced to depend upon the minimum requirements of its customers.

Tin plate demand shows little change, and operations continue at the recent rate.

Steel ingot production in the district has fallen off and averages barely 15 per cent this week. A further decline is also reported in the Valleys, where output is off two points to about 15 per cent. In the Wheeling district, production is unchanged at the recent comparatively high level.

Blast furnace activity in the Pittsburgh district will be increased by the blowing in of a stack at Monessen, Pa., at the end of the week.

Steel prices have given no ground in the last week, and announcement of second-quarter quotations on sheets is expected this week. Increases are still looked for. Quotations on reinforcing bars have been revised in an effort toward stabilization, and are now at 1.40c., Pittsburgh. Heavy hot-rolled products are still well maintained.

Pig Iron

Shipments of pig iron in this district are barely holding their own, and some foundries have decreased their requirements in the last week or two. Prices are unchanged, with the quoted figures in Pittsburgh and the Valleys holding only on tonnage which does not meet outside competition. The Neville Island furnace at Pittsburgh will be blown out in the next week.

Semi-Finished Steel

No change in this market is reported, but the requirements of buyers of billets, slabs and sheet bars have been lighter recently. The price is holding at $26, Pittsburgh or Youngstown, and has been tested on two or three recent sales. Forging billets are well maintained at $31, Pittsburgh, and wire rods at $35.

Rails and Track Accessories

The market is very quiet, and releases of track accessories are only holding their own. Rail inquiry by leading Eastern carriers is still deferred, and mills have little definite information as to when such business will come before the trade.

Bars, Plates and Shapes

A falling off in demand for small miscellaneous lots of heavy hot-rolled steel products has given the market a less cheerful tone in the last week. Several large structural projects are still before the trade, but interest is centered in the San Francisco bridge, on which bids will be taken next week. A few large Federal projects remain to be closed, but revision in the loan policy of the Reconstruction Finance Corporation is believed to be necessary before the market can show much improvement. Several of the barge yards in the district are engaged in a limited way on orders placed since the first of the year. Contracts for additional river craft are expected in the near future. Demand for merchant bars is not as heavy as it has been. Alloy steel bar shipments show no gain.

Stabilization of the reinforcing bar price is being attempted, with announcement of a minimum quotation of 1.40c., Pittsburgh, on 40, 50 and 60-ft. lengths, with the usual 15c. a 100 lb. premium on cut sizes. The same price has been established at Buffalo and Chicago, while Cleveland and Detroit take 1.45c. and 1.55c. respectively. Rail steel bars are quotable at 1.30c., f.o.b. Eastern mill. Structural shapes, plates and merchant bars are being held at 1.60c., Pittsburgh, with no more than the usual concession being granted to large buyers.

Wire Products

The approach of warmer weather has increased activity in the wire trade in a mild way, but specifications are still very light. The recent price advance on merchant products has stimulated jobber buying to some extent, and most users are now covered for the remainder of the quarter. Manufacturers' wire is quoted at 2.10c., Pittsburgh, and nails at $1.85 a keg.

Tubular Goods

Movement of pipe to the oil country is still curtailed considerably from what it was in January. The line pipe market has been featured by the placing of a 24-mile 8-in. project in the Southwest for the Southern Union Gas Co., which went to Spang, Chalfant & Co., Pittsburgh. The line requires 2000 tons of steel. Other line pipe jobs are being talked of, but no definite inquiries have been reported. Demand for standard pipe shows no change, and awaits improvement in the building industry. Mechanical tubing is less active than it has been.

Sheets

Producers who serve the automotive industry to a large extent report a slight falling off in their business in the last week. Miscellaneous demand seems to be holding up fairly well, but there has been no expansion this month. Operations range from 18 to 20 per cent of capacity, with some mills maintaining a substantially higher rate. Announcement of first-quarter prices on sheet mill products, which is expected to bring about a considerable change in base prices, has again been postponed, but is expected to be made this week. In the meantime, recent quotations are nominally representative of the market.

Tin Plate

Specifications continued comparatively heavy last week, but brought about no increase in mill schedules, which continue at about 45 per cent of capacity. The base price of $4.25, Pittsburgh, is being generally maintained.

Strip Steel

A falling off in demand for hot and cold-rolled strip is reported by a number of makers, and curtailed buying by the automotive industry is generally given as the reason. Miscellaneous demand from manufacturing consumers is so light that week-to-week variations are hardly noticeable. Hot-rolled strip continues at 1.45c., Pittsburgh, but cold-rolled material is weak at 1.80c. to 2c. A few quotations made recently indicate an even wider range of prices.

Coal and Coke

With demand for domestic coke now running on a hand-to-mouth basis, there seems little likelihood of any further buying movements this season. The foundry grade shows n change, and scarcely any demand for furnace material is reported. Coke prices are generally weak, but show no marked change.

Scrap

The scrap market has retained its recent strength on the basis of sales in the last week. A large interest

has bought No. 1 heavy melting steel at $8.50, and a few cars were picked up by another buyer at $8.25. In the meantime, dealers are reported to have bid $9 and more for the No. 1 steel on the Pennsylvania Railroad list, upon which bids close March 1. The list contains 34,900 tons, including 10,000 tons each of rails and heavy melting steel. A little No. 1 steel is still being bought by dealers to cover old orders at as low as $8, and the market range continues at $8 to $9, with the $8.50 average in line with the most recent purchase of the base grade. Hydraulic compressed sheets continue strong, particularly on material coming from Michigan producers. No. 2 steel is being bought by dealers at $7.25 and $7.50, while machine turnings are strong at $6.25 to $6.75. A buyer of iron carwheels and steel car axles has accumulated a fair tonnage, and is slowing down its purchases by lower offering prices.

▲▲ OBITUARY ▲▲

WILLIAM FORD MORELAND, vice-president of the Interstate Iron Co., ore mining subsidiary of the Jones & Laughlin Steel Corpn., Pittsburgh, died at his home in that city on Feb. 26. He was born in Pittsburgh in 1896, and attended the Hill School and Yale University. Following distinguished service in the World War, he entered the service of the Jones & Laughlin company, and spent two years in the iron mines at Virginia City, Minn. Since that time he had been located in the company's general offices. Mr. Moreland was a son of William C. Moreland, vice-president of the Jones & Laughlin company.

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THOMAS A. BEATTIE, general superintendent of the National works, National Tube Co., McKeesport, Pa., died in the Montefiore Hospital, Pittsburgh, on Feb. 26, following injuries received in an automobile accident a few days before. Mr. Beattie had been identified with the National company for 50 years, having served as general manager of Riverside works, Wheeling, W. Va., from 1900 until 1929, when he was transferred to McKeesport.

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FRED ATWATER, president and founder of the Columbia Nut & Bolt Co., Bridgeport, Conn., died at the Bridgeport Hospital on Feb. 23, aged 62 years. He went to that city in 1879 and started work in his father's foundry, the Bridgeport Malleable Iron Co.

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WALTER H. KLEIN, formerly a member of the firm of the Jones Steel & Iron Works, Boston, died at his home in Natick, Mass., Feb. 20. He retired from business about nine years ago. Mr. Klein was born in Milford, Mass., in 1865.

Great Britain Preparing For Greater Industrial Activity

More Blast Furnaces to be Blown In—Pig Iron Business Expanding —Continental Market Nervous

LONDON, ENGLAND, Feb. 27 (*By Cable*)—Preparations that are being made for the blowing in of additional blast furnaces during March indicate the expectation of greater industrial activity in the near future. Pig iron business is already showing expansion.

British mills are now supplying virtually all of the domestic requirements in semi-finished steel. Imports from the Continent have almost ceased. Finished steel is quiet, but increasing shipyard business is expected to improve the situation.

Demand for prime and waster tin plate in stock is active, although export sales are slow except for the Far East and Australia. Mills are in a better position as a result of fair-sized bookings for shipment throughout the year.

Broken Hill Proprietary will erect tin plate mills at Newcastle, New South Wales.

The Continental steel market is nervous on account of the uncertainties as to the outcome of negotiations for sales syndicates connected with the Raw Steel Cartel. Far Eastern buying of steel has slackened. The recently reorganized cartel controls exports but not production. It has been formed for a five-year period, but is renunciable when the annual total of exports is less than 6,000,000 metric tons. Quotas are arranged on sliding scales. A subsidiary, the Hoop Iron Syndicate, has been formed for a period of two years. Syndicates for semi-finished steel plates and flat billets are being discussed.

Following an enforced price cut, the Polish Government has ordered 54,000 tons of rolled steel from Polish mills.

The French steel works Lorraine Miniere et Metallurgique is shutting down.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hearth	£5 to £5 7s. 6d.
Black sheets, Japanese specifications	£11
Tin plate, per base box	15s. 9d. to 16s.
Steel bars, open-hearth	£7 17½s. to £8 7½s.
Beams, open-hrth.	£7 7½s. to £7 17½s.
Channels, open-hearth	£7 12½s. to £8 2½s.
Angles, open-hearth	£7 7½s. to £7 17½s.
Black sheets, No. 24 gage	£8 10s.
Galvanized sheets, No. 24 gage	£10 10s. to £10 15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2 3s.
Wire rods, No. 5 B.W.G.	£4 10s.
Black sheets, No. 31 gage, Japanese	£11 5s.
Steel bars, merchant	£2 10s. to £2 15s.
Beams, Thomas	£2 5s.
Angles, Thomas 4-in and larger	£2 9s.
Angles, small	£2 11s.
Hoops and strip steel over 6-in. base	£3 12s. 6d. to £3 15s.
Wire plain, No. 8.	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed. 4-pt. No. 10 B.W.G.	£8 15s.

Bethlehem Steel Pays $782,000 in Pensions

Bethlehem Steel Corpn. paid $782,158 in pensions during the year 1932, according to the annual report of Bethlehem's General Pension Board.

These pensions which are paid wholly by the corporation have been particularly helpful for long-service employees during the present industrial situation.

There were 430 workers added to the pension roll during the past year, the men having an average age of 67.4 years.

Out of the total number of pensioners this year 31 had continuous service records exceeding 50 years and 72 had service records exceeding more than 45 years. The average period of service was 35.8 years.

Trade Notes

Tuthill Spring Co., 760 Polk Street, Chicago, manufacturer of highway guards, has appointed the following distributers in the respective territories: Colorado, Lester Knight, Jr., 223 North Whasatch Avenue, Colorado Springs; Nevada, Paul Tholl, Sparks; South Dakota, J. D. Evans Equipment Co., Rapid City; West Virginia, J. V. Mullen, Parkersburg, and Wisconsin, D. H. Beckwith, Shorewood Hills, Madison.

National Rust Prevention & Waterproofing Co., 3040 South Main Street, Los Angeles, has appointed Frazar & Co., Ltd., 7 Front Street, San Francisco, as its exclusive distributer for Saverite, a penetrating and sealing rust preventive and waterproofing treatment for iron and steel and other surfaces.

David W. Devine has been appointed representative in the Wisconsin territory, with offices at 505 North Water Street, Milwaukee, for the Chicago Steel Service Co., distributor of Toncan and Enduro products for the Republic Steel Corpn.

Chicago Ingot Output Lower As Steel Sales Fall Off

Rate for That District Now 16 Per Cent, Loss of Two Points—Warehouse Business Gains Substantially

CHICAGO, Feb. 28.—Both sales and specifications in the last week in February have failed to hold recent levels and mills have been forced to cut production. Ingot output is off at least two points to an average near 16 per cent of capacity. On the other hand, warehouses report the first substantial increase in business since the first of the year.

Releases are lighter from most automobile builders, Ford and Chevrolet being outstanding exceptions, and quite a number of industries have failed to respond to the approach of spring. Demand for roofing in the South is far below expectations and inquiries in the North do not at the moment hold much promise. Use of wire products in the South remains spotty, but in the aggregate it is somewhat better. Reports from the Northwest are distinctly encouraging. While it is too early to expect volume business from that section of the country, conditions are said to favor a fair spring movement.

The scrap market is quiet except for the activity of a few short interests and recent purchases by malleable foundries, which find business is improved.

Pig Iron

Shipments in the 28 days of February exceeded the total for the longer month of January by 10 per cent. Much of this improvement is accounted for by greater activity among malleable foundries. Hold-ups in shipments are not in evidence from Michigan, though some check in immediate needs is noted in Indiana. Sales of Northern foundry iron are steady, with a few lots of 500 to 1000 tons being sought.

Warehouse Business

Prices for galvanized and hot-rolled sheets and rivets are being marked down for Chicago delivery. Rivets are off $20 a ton, but this reduction is less drastic than it appears because of a new list of quantity extras. Warehouse business in the first three weeks of February fell below the January rate. However, in the last few days there has been a notable increase in the number of orders, which are still very small individually.

Cast Iron Pipe

This market remains at a standstill. Most sellers place their hopes for spring business on liberalization of loans by the R. F. C. and the fact that new public officials have not yet had time to formulate and announce plans.

Reinforcing Bars

Dealers still have their attention fixed on higher prices, and it is suggested that 1.40c. a lb. may be the minimum on billet bars and 1.30c. on the rail steel commodity. These prices are $2 a ton above prices quoted by the mills. Several small brewery rebuilding jobs are out for figures. Otherwise the market is very dull. Indiana has called off a road letting scheduled for this week and Iowa is holding all road plans in check. Dealers are uncertain as to the extent of the Illinois program for 1933.

Bolts, Nuts and Rivets

Moderate improvement is noted in releases by jobbers in the Southwest. Locally, however, distribution by warehousemen is very light. A few small specifications have recently been entered by farm implement manufacturers. Sellers are actively preparing second quarter contracts at unchanged prices.

Sheets

Sheet mill output in this district averages close to 15 per cent of capacity and orders remain spotty and small in size. The roofing business in the South and Southwest is disappointing and early interest shown in the North is far from assuring. The automobile industry is still the backbone of the market, but even this source of business is less active than earlier in the month. Plants making miscellaneous stampings from sheets report business slow and scattered. Prices are somewhat better stabilized, though there still is unsettlement in the light gages and roofing products.

Wire Products

February shipments of wire products are about 15 per cent heavier than those of January, but this upward swing has been noticeably checked in the last few days. Sellers are inclined to believe that the banking situation in Michigan and in other spots surrounding Chicago is an important factor in the change of drift. There are still deviations here and there in the price structure, but this condition is not serious. Some sporadic orders are coming from the railroads, and producers are inclined to believe more business of this kind will come as spring arrives. Orders from the oil fields are light, but other sources in the Southwest and in the South are making heavier use of wire products. The tonnage from the Northwest is light, but conditions favor an upturn.

Rails and Track Supplies

What amounts to a sudden hush has settled over the rail market. Few are now willing to make any assertion as to the probability of purchases in the near future. In the meantime, both of the rail mills in this district are idle. Track supply orders hold remarkably steady. These are small and move at rather frequent intervals, indicating that urgent repair work is being pressed through the winter.

Structural Material

Recent awards total 2000 tons. About one-fourth of this tonnage was for private work, including a railroad bridge and extensions to a boiler house. Fresh inquiries, except in very small tonnages, are lacking and the outlook is doubtful.

Plates

Denver, Colo., is ready to take bids on 1000 tons of water pipe for temporary construction. This is the plan that supersedes one for permanent construction which called for over 4000 tons of pipe. A 500-ton brewery job is again active at Milwaukee. Brewery plans generally are marking time. Tank business is confined to a few scattered orders.

Bars

The tonnages moving to automobile manufacturing centers are lighter, but miscellaneous users have not diminished their needs. It is estimated by sellers that bar stocks in the hands of consumers do not equal 10 per cent of normal requirements. Road machinery builders continue to move cautiously, and farm equipment manufacturers find no improvement in business in spite of moves to guarantee farm products prices.

Scrap

This market continues to drift. Local yards are piled high, but most of this accumulation is agricultural and automobile scrap grades that mills do not want now. The fact of the matter is that specifications are drawn so closely by mills that there is virtually a shortage of the higher grades. Short interests in cast iron borings are scouring the district and are paying higher prices for the small lots that are available. The Burlington has sold most of its recent offering of 4000 tons and now the Milwaukee Road is offering 5000 tons. Several Eastern railroads have sent out lists, but not much of their scrap will be brought to Chicago.

Eastern Pennsylvania Trade Affected By Buyers' Caution

Markets Are Sluggish, Probably a Reflection of Uncertainty Over Banking Situation—Operations Unchanged

PHILADELPHIA, Feb. 28.—Trading in iron and steel has become more sluggish. Sentiment also is less cheerful. Disturbances in the banking situation are partially responsible for the loss of tone in the market. It is offset, however, to some extent by the forthcoming change in the Federal administration this week. It is felt that the uncertainties of the legislative situation will now give way to fixed policies under President Roosevelt and that business will become more stabilized.

Buying movements of importance do not appear to be an early prospect. All consumers continue to show great caution and are buying only according to immediate necessities. Mills claim the market is somewhat firmer in galvanized sheets and wire and wire products as the result of efforts to stabilize prices. Nevertheless irregularities have not disappeared. An effort is being made to strengthen the market for reinforcing bars.

Operations remain at 10½ per cent of steel works capacity.

Pig Iron

Demand for pig iron is dull and signs are developing of an easier tone in both steel-making and foundry grades. A shipment of 4000 tons of Royal Dutch iron has reached Port Newark, N. J., part of it for delivery to a cast iron pipe foundry on the Delaware River. A shipment of 50 tons of standard ferromanganese from Germany has just been received in Philadelphia and is the forerunner of other importations of this material. The German ferroalloy will be stocked under bond at South Chester, Pa., held ready for quick delivery to domestic users.

Plates, Shapes and Bars

The market is extremely dull. Plates are quoted at 1.50c., Coatesville, for carlots, and 1.60c. for less than carlots. Shapes are quoted at 1.60c., Eastern mill, and merchant bars at 1.60c., Pittsburgh. The American Bridge Co. was awarded steel for the Naval Hospital in Philadelphia, requiring 2800 tons. The Phoenix Bridge Co. was awarded the steel work, 2500 tons, for the Reading Railroad bridge near Rupert, Pa. Makers have submitted bids for a floating drydock for the Navy at San Diego, Cal., requiring 1200 tons of plates, 300 tons of angles and 250 tons of channels. A tugboat for the Government requires 200 tons of structural material. Makers of reinforcing bars are attempting to stabilize prices.

Warehouse Business

Reductions of $5 a ton on No. 24 hot-rolled annealed and galvanized and $4 on No. 10 hot-rolled sheets have been announced by jobbers. The warehouse market is quiet.

Sheets

The effort to stabilize sheet prices for the second quarter is being pushed strongly by some mills. Low prices, however, still are reported, especially on cold-rolled material. The quotation of 2.60c., Pittsburgh, on galvanized sheets, appears to be fairly firm.

Imports

The following steel and raw material imports were received here last week: 984 tons of chrome ore from Yugoslavia, 66 tons of steel rounds and 30 tons of steel bands from Belgium, 53 tons of sponge iron from Sweden, 39 tons of steel bands and 22 tons of structural shapes from Germany.

Scrap

The market has eased and become dull. Prices are unchanged.

Birmingham Pig Iron Trade Shows No Gain

BIRMINGHAM, Feb. 28.—There is no change in the restricted scope of the pig iron market, with current business still on a day-to-day basis. Bookings are small, irregular and uncertain. February shipments of the three producers of foundry iron in this district failed to keep step with those of January. The slight upward turn that took place the latter part of January did not continue in February. Kansas City released about 2000 tons of 20-in. pipe to three Birmingham plants last week, from bids opened on Feb. 8, as previously reported. Los Angeles opened bids last week on about 3400 tons of 8-in. pipe, and three Birmingham plants were low bidders. This tonnage will probably be awarded this week, but will not be shipped immediately, as it is for requirements from April to September. The price of $11 for pig iron in the Southern market is unchanged. Two blast furnaces are operating, one on foundry and one on basic iron.

Steel

A moderate improvement in steel bookings extending over three weeks came to a halt last week. Current demand still consists mostly of small orders, well distributed as to sources and product. February bookings were ahead of those for January, and the outlook for March is at least hopeful. The Ensley rail mill of the Tennessee Coal, Iron & R. R. Co. operated Thursday, Friday and Saturday of last week, but is idle this week. Seven open-hearths were active last week and the same number will be in service this week. This level has been maintained for more than a month.

Cincinnati Pig Iron Orders Show Small Spurt

CINCINNATI, Feb. 28.—A slight spurt in the number of carload bookings for pig iron the past week brought the level of demand above 400 tons for the second time in February. Accordingly, the month's average weekly bookings were slightly above the rate of January and December. Foundries are operating at a low rate, although one or two stove foundries are running four days a week. One or two machine shop foundries are open three days a week, but this is the result of pooling of orders. Inquiry continues to be small, the trade being without substantial pending business.

Coke

Prices on foundry grades of coke will continue at about $9.05, delivered in Cincinnati, during March.

Steel

Easing of automotive demand the past week brought the level of new business to slightly under 30 per cent of capacity. All automobile manufacturers, except for one builder of low-priced cars, reduced their specifications the past week. The usual seasonal improvement in jobbers' demand has not materialized. Manufacturers of electric refrigerators are alone in sustaining demand. Stove producers have curtailed sheet bookings noticeably.

Scrap

Prices are nominal. New business is small, mills having decided to forego contracting while awaiting business improvement.

Detroit Scrap Trade Is Marking Time

DETROIT, Feb. 28.—The local scrap market is marking time until the financial situation and the trend of steel demand are clarified. Prices are holding fairly well and are unchanged. Two boatloads of scrap have been shipped this month to a Cleveland steel maker by a local dealer. This movement is expected to continue regularly barring another period of zero weather which would make navigation impossible.

Cleveland Steel Trade Sharply Affected by Banking Situation

Automobile Orders Decline Materially—Industrial Plants Handicapped by Lack of Cash for Payrolls

CLEVELAND, Feb. 28.—Business in finished steel declined the past week and, with unfavorable developments in the banking situation, the outlook for the present week is far from promising. Withdrawals from local banks, brought about by the moratorium in Michigan, caused banks in Cleveland and many other industrial centers in Ohio to place in effect Monday sharp restrictions on withdrawals and, as a result, industrial plants are having difficulty in meeting payroll and other obligations. Under the circumstances, steel consumers are marking time and are ordering only such material as needed for production under way.

New demand from the motor car industry has fallen off materially and some of the producers have little unfilled tonnage on orders from that field. As a result, four open-hearth furnaces have been taken off in Cleveland, reducing the ingot output 12 points to 23 per cent of capacity and a fifth furnace will go down tonight. The Otis Steel Co. has taken off three furnaces in the past few days. The Corrigan, McKinney Co. has taken off one and will shut down another tonight.

In spite of the downward tendency in the demand, some of the mills booked a fair volume of miscellaneous tonnage during the week and their February volume in this territory shows a gain over that of January. Total tonnage was increased considerably by orders for structural material for work placed some time ago. Railroads in this territory are still out of the market.

Important developments in the price situation are lacking. Expected upward revision on sheets has not yet been announced. While wire is holding firmly at published prices, weakness is reported on nails, which may be due to offerings by some jobbers who covered at prices well below the present mill quotations.

Pig Iron

Shipments to consumers this month have been slightly ahead of those of January. New demand shows no improvement, being confined to small lots for immediate needs from miscellaneous consumers. A leading producer sold 1000 tons in foundry and malleable grades during the week. Jobbing foundry business remains slack. Prices continue steady in the absence of any recent tonnage of sufficient size to test the market.

Sheets

New demand and specifications from the motor car industry have declined, resulting in some slowing down in production. Business from miscellaneous sources is light. Prices appear fairly steady, with no concessions below recent minimum quotations on most grades, but the expected announcement of a stiffening in prices has not materialized. While there are reports of quotations below 2c. on hot-rolled annealed sheets, the market appears to be fairly well stabilized at 2c. to 2.10c., Pittsburgh, for this grade. The 2.50c. price has not disappeared on galvanized sheets, although several mills are holding to 2.60c.

Strip

Releases from the motor car industry for March production have tapered off, and not much business is coming from other sources. Prices are steady at 1.45c., Pittsburgh, for hot-rolled strip and 1.80c. to 2c., Cleveland, for cold-rolled material.

Bolts, Nuts and Rivets

Prices on bolts and nuts for the second quarter will remain unchanged at 75 per cent discount, as announced by the leading maker. Present prices on rivets probably will also be reaffirmed for the coming quarter, although an official announcement has not yet appeared. Bolt and nut business this month showed little change from January. Demand from the motor car industry has declined, but business from railroads remains fair. Scarcely any business is coming from jobbers.

Bars, Plates and Shapes

New demand for merchant bars has slackened, orders being smaller in size and many being for less than car lots. Efforts to stiffen prices on billet steel reinforcing bars in other districts probably will have little effect here where the market appears well stabilized at 1.40c., Cleveland. Ohio will take bids March 10 for highway work requiring 300 tons of structural steel for several bridges. A few private jobs taking less than 100 tons have been placed. Prices are steady at regular quotations.

Scrap

Activity is confined largely to demand from dealers for heavy melting steel and No. 1 busheling for delivery to Youngstown mills. Prices being paid for the two grades are $8.25 and $7.50 respectively. There is no new demand from consumers. Local mills are taking virtually no scrap. Prices are unchanged.

Buffalo Pig Iron Dull; Scrap Market Firmer

BUFFALO, Feb. 28.—Sales of pig iron are limited to carload lots. Inquiries are practically nil, and the melt is very low. Only one blast furnace is operating in this territory.

Steel

The Lackawanna plant of the Bethlehem Steel Corpn. continues to operate four open-hearths. Republic Steel is operating two and Wickwire Spencer one. A contract for 900 tons of reinforcing bars for an addition to the Gowanda State Hospital was awarded to a leading Buffalo interest.

Scrap

Despite lack of business, the market has taken on a firmer tone owing to the influence of export shipments of scrap.

Pipe Lines

Moran Corpn. of Texas, Conroe, Montgomery County, Tex., operating natural gas distributing system, is completing surveys for new 10-in. steel pipe line from Conroe fields to Houston, Tex., and vicinity, about 35 miles.

Liquefied Natural Gas Corpn., Foshay Tower, Minneapolis, has plans for steel pipe lines for trunk and distributing service at Wisconsin Rapids, Wis., and vicinity. Work is scheduled to begin in spring.

John W. Moore Construction Co., Lubbock, Tex., is considering new welded steel pipe line for natural gas supply from Hobbs gas fields, Lea County, N. M., to Lubbock and vicinity, about 100 miles. It is proposed to begin work in spring. Cost over $300,000.

Michigan Natural Gas Corpn., Bliss Keeler, East Lansing, Mich., head, has plans for welded steel pipe line from Mount Pleasant field, central Michigan, to Bay City, Saginaw and vicinity, about 30 miles. Company has also applied for permission to build natural gas line from point noted to Alma and other communities in Gratiot County.

Los Angeles has awarded 3880 tons, about 180 miles, of 5 to 8-in. steel pipe to Ducommun Corpn.

Cast Iron Pipe

Metropolitan Water District of Boston has awarded 2125 tons of 20-in. to Warren Foundry & Pipe Corpn.

State of New York is inquiring for about 200 tons of various sizes up to 30-in. for several projects.

Wilmington, Del., has awarded contract to R. D. Wood & Co., Philadelphia, for pipe for city water department.

Constructing Quartermaster, 39 Whitehall Street, New York, will take bids until March 10 for 12-in. water supply connecting line at Fort Jay, N. Y. (Circular 6).

Fort Lewis, Wash., has awarded 264 tons of 4 to 16-in. pipe to Central Foundry Co.

Beverly Hills, Cal., will take bids March 14 for 77 tons of 4 to 8-in. pipe.

Railroad Equipment

Koppel Industrial Car & Equipment Co., New York, has received order for 100 narrow-gage cars for export to Haiti.

New York Steel Business Shows a Marked Decline

Business Probably Affected by Uncertainty Over Banking Situation—Price Stabilization Moves Slowly

NEW YORK, Feb. 28.—Except for a fair volume of tin plate specifications, steel business in the New York district in the past week was extremely small, falling below the average level of preceding weeks. This decline is generally ascribed to the uncertainty over the banking situation.

The only steel tonnage of importance was in the building construction field. The Truscon Steel Co. was awarded a contract for 2500 tons of reinforcing bars for the New York Central's St. John's Park freight terminal. Bids are being taken on 3500 tons of fabricated structural steel and 1800 tons of reinforcing bars for New Jersey highway work.

Efforts to stabilize prices are proceeding slowly. No announcement has been issued by any company on second quarter sheet prices, but one is expected this week. In all probability there will be small advances on some grades. Meanwhile, galvanized sheets are being held firmly at 2.60c., Pittsburgh, by most companies, but there are not many sales as contract coverage at lower prices was quite general. The stabilization movement has extended to concrete reinforcing bars. The weakest item in the list of steel products is plates, which are commonly being sold at 1.40c. a lb., Coatesville, and on some attractive tonnages even lower prices have been quoted.

Pig Iron

Inquiry is still spotty. Sales are holding to recent low levels, with last week's bookings barely totaling 900 tons, compared with 800 tons in each of the two preceding periods. Base prices of eastern Pennsylvania and Buffalo brands are unchanged. The advent of Royal Dutch iron through Port Newark, however, promises a highly competitive situation in northern New Jersey. Dutch iron is being offered for truck delivery to local points at prices that are understood to be lower than those for domestic brands. A major share of the initial Royal Dutch cargo arriving at Port Newark has been sold to a Delaware River pipe maker. Southern iron, because of its high delivered cost, continues to be noncompetitive in this district.

Reinforcing Bars

Both inquiries and awards showed improvement during the week. Fresh specifications were featured by several highway projects in New Jersey, which will require about 1800 tons of bars. Truscon Steel Co. was awarded a contract for 2500 tons of bars by James Stewart & Co., Inc., for the New York Central's St. John's Park freight terminal. About 270 tons for a postoffice at Albany, N. Y., were placed with Concrete Steel Co.

Scrap

Announcement today of a temporary ban by Great Britain on shipments of munitions to the Far East has fostered further concern here in connection with exportation of American scrap to Japan. Opinion as to the possible turn of events is divided. The chief point of debate is whether, in the event that the United States follows Great Britain's action, such an embargo would be restricted to munitions or cover the broader classification of "war materials." In the latter case, steel scrap would undoubtedly be affected. Meanwhile, loading of No. 1 steel for shipment to Japan continues, while No. 2 is being accumulated for delivery to Italy and Poland. Prices for these grades are unchanged. Cast grades and specialties are lifeless in the face of poor demand from domestic users.

Pacific Coast Tonnage Light; Some Jobs Pending

SAN FRANCISCO, Feb. 27.—Very little tonnage has been placed during the week and few new projects have been added to the pending list. Bids are to be taken on Feb. 28 in San Francisco on the Federal office building, which will require 4500 tons of structural steel and 700 tons of reinforcing steel. The date for bids on the San Francisco Psychopathic Ward have been postponed to April 5. At Seattle, Wash., 6000 tons of plates will be used on the Skagit River project, while at Tacoma 2500 tons of plates are dependent on the contemplated R. F. C. loan or the sale of bonds. Bids have been taken at Los Angeles on 3323 tons of cast iron pipe and for 1400 tons at San Francisco, but contracts have not yet been awarded.

New England Pig Iron Sales In Truck Lots

BOSTON, Feb. 28.—Pig iron buying the past week was very largely confined to truck lots and in the aggregate did not exceed 200 tons, the smallest volume reported for any week during the depression. There is no business in sight. The New England melt continues at about 10 per cent of rated capacity. In the absence of real business, prices are holding, with Dutch iron still quoted at substantially below domestic prices.

Activity in scrap centers in the export market. A Chelsea, Mass., dealer is buying automobile parts and miscellaneous scrap to fill a 3800-ton order for Danzig, now loading, and has tentative plans for additional exports to Japan. February exports included 1445 scrap automobile radiators for a Continental port. Buying of scrap for domestic consumption is still confined to scattered carlots, mostly No. 1 heavy melting steel and chemical borings.

St. Louis Railroads Issue Small Inquiries

ST. LOUIS, Feb. 28.—The local maker sold approximately 600 tons of pig iron in scattered lots during the last week. Jobbing foundries are said to be showing greater activity. Shipments against contracts by the local maker show a slight increase. Pig iron prices are unchanged.

Steel

Several railroads have issued inquiries for bridge beams for repair work, the largest of which is 118 tons for the Missouri Pacific. The Laclede Steel Co. has been awarded 225 tons of reinforcing bars for a local sewer project. Trade in plate, shapes, bars and sheets continues to mark time.

Scrap

The Terminal Railway Association is out with a list of 8500 tons of scrap, its first offering in 18 months, including 3000 tons of yard scrap, 1500 tons of heavy melting steel and 1000 tons of rerolling rails. It is not expected that the sale of this material will have any considerable effect on the local market. Prices are nominally unchanged. Steel mills are buying very little raw materials.

Canadian Steel Output Highest Since March

Canadian production of steel ingots and castings in January totaled 40,766 tons and was the highest for any month since the 43,572 tons of March, 1932. The January improvement was in ingots which rose to 39,820 tons from 29,986 tons in December.

Pig iron production also gained, having been 29,209 tons in January, or 7 per cent above the output of 27,031 tons in December, which was the best month in 1932. The pig iron increase was in the basic grade, output of which was 27,459 tons against 22,842 tons in December.

January production figures and comparisons follow:

	Jan. 1933	Dec. 1933	Jan. 1932
Pig iron	29,209	27,031	10,305
Steel ingots and direct steel castings	40,766	30,755	25,060
Ferroalloys	1,217	1,090	1,823

Fabricated Structural Steel

Awards in Larger Volume—New Projects Decline

BOOKINGS of 16,300 tons were the third largest since the first week in January and compare with 7500 tons a week ago. Spans for the approach to the Golden Gate bridge at San Francisco account for more than one-half of this week's total. New projects of 7450 tons include 3500 tons for a viaduct over the Pennsylvania Railroad yards at Newark, N. J., on which bids will be taken March 13, and 2500 tons for a bridge at Omaha, Neb. Lettings of fabricated steel reported for February totaled 47,000 tons, compared with 90,465 tons in January and 66,842 tons in December. Awards follow:

NORTH ATLANTIC STATES

Endicott, N. Y., 205 tons, Erie Railroad grade crossing elimination, to Mount Vernon Bridge Co.

State of Maryland, 175 tons, highway bridge over Wicomico River, to Shippers Car Line Corpn.

Washington, 100 tons, bus terminal, to Belmont Iron Works.

Philadelphia, 2800 tons, Naval hospital, to American Bridge Co.

Rupert, Pa., 2500 tons, bridge over Susquehanna River for Reading Co., to Phoenix Bridge Co.

CENTRAL STATES

Akron, Ohio, 150 tons, Park Street bridge for Pennsylvania Railroad, to Burger Iron Works.

Alma, Wis., 575 tons, locks in Mississippi River, to Duffin Iron Works.

Chicago, 230 tons, addition to boiler room for Wilson & Co., to McClintic-Marshall Corpn.

Oak Park, Ill., 450 tons, post office, to an unnamed bidder.

State of Illinois, 118 tons, highway bridge in Monroe County, to St. Louis Structural Steel Co.

Ottawa, Ill., 250 tons, bridge for Chicago, Burlington & Quincy Railroad, to American Bridge Co.

WESTERN STATES

San Francisco, 240 tons, telephone company building, to Judson-Pacific Co.

San Francisco, 8500 tons, Golden Gate bridge approach spans, to American Bridge Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

State of New Jersey, 3500 tons, viaduct, route 21, section 1, over Pennsylvania Railroad yards at Newark; bids March 13.

Stapleton, N. Y., 2000 tons, United States Marine Hospital; Dyer Construction Co., low bidder for general contract.

Philadelphia, 200 tons, addition to plush manufacturing plant of Collins & Aikman Co.; bids in.

CENTRAL STATES

Duluth, Minn., 250 tons, hospital.

St. Louis, 125 tons, beams for bridge repair work for Missouri Pacific Railway.

Omaha, Neb., 2500 tons, Farnum Street bridge over Missouri River.

Wichita, Kan., 600 tons, State highway bridge.

WESTERN STATES

Berkeley, Cal., 140 tons, Kress department store; bids March 6.

Ventura, Cal., 100 tons, post office; bids March 24.

FABRICATED PLATE

AWARDS

Enid, Okla., 1500 tons, oil tanks for Champlin Refining Co., to Pittsburgh-Des Moines Structural Steel Co.

NEW PROJECTS

Denver, 1000 tons, revised plans for a water line.

Seattle, 6000 tons, pipe line, Skagit River project.

Tacoma, Wash., 2500 tons, 42 to 58-in. pipe, dependent on R. F. C. loan or sale of bonds.

Fabricated Structural Steel Bookings Gain

The American Institute of Steel Construction, 200 Madison Avenue, New York, which has taken over the statistical work on fabricated structural steel conducted for many years by the United States Department of Commerce, has issued its first report, covering January. Although the institute is not following precisely the statistical methods of the Department of Commerce, it has compiled figures for last year in the same manner as those for January, so that a basis for comparison is afforded.

The fabricated structural steel tonnage booked in January, according to the institute, was 72,251 tons against 46,645 tons as the average monthly bookings of the first half of 1932. Shipments in January were 49,185 tons against average monthly shipments of 70,807 tons in the first half of last year. However, 146 companies reported their figures for January, while reports for the first half of 1932 were from only 111 companies. The institute bases its reports on the number of companies, whereas the Department of Commerce counted the number of establishments, listing each unit separately even when several are owned by one company.

A new feature is included in the institute's report, namely, the tonnage on hand for future fabrication. At the end of January this was 168,455 tons, with 78 companies reporting, against an average of 67,239 tons in the first half of 1932, with 62 companies reporting; 73,507 tons average in the third quarter, with 79 companies reporting, and 119,107 tons average in the fourth quarter, with 73 companies reporting. Reports for 1932 were obtained from companies having 73 per cent of the capacity, while those for January represent 75 per cent of the capacity.

Fabricated Structural Steel

	First Half (1932) Average per Month	Third Quarter (1932) Average per Month	Fourth Quarter (1932) Average per Month	January, 1933
Number of companies reporting	111	143	150	146
Tonnage booked	46,645	58,257	63,203	72,251
Tonnage shipped	70,807	57,198	59,134	49,185
Tonnage on hand for future fabrication—				
Companies reported	(62)67,239	(79)73,507	(73)119,107	(78)168,455
Companies reporting no work ahead	30	37	43	42
Companies making no report on work ahead	19	27	34	26
Percentage of industry reporting, per cent			73	75

Reinforcing Steel

Awards 5500 Tons—New Projects 3250 Tons

Albany, N. Y., 269 tons, post office, to Concrete Steel Co.

New York, 2500 tons, St. John's Park freight terminal, New York Central Railroad, to Truscon Steel Co.; James Stewart & Co., Inc., New York, general contractor.

Gowanda, N. Y., 900 tons addition to State hospital to a Buffalo bidder.

St. Louis, 225 tons, section B, Humboldt sewer, to Laclede Steel Co.

Yuma, Ariz., 100 tons to Pacific Coast Steel Corpn.

Orange County, Cal., 110 tons, state paving, to Soule Steel Co.

San Bernardino County, Cal., 365 State paving, to Soule Steel Co.

Barstow, Cal., 100 tons, State bridge, to Soule Steel Co.

Venice, Cal., 117 tons, Culver crossing, to Blue Diamond Corpn., Ltd.

Los Angeles County, Cal., 495 tons, State highway, to Blue Diamond Corpn., Ltd.

Los Angeles County, unstated tonnage, Big Tujunga wash project, to Concrete Engineering Co.

Los Angeles County, 152 tons, State highway, to Soule Steel Co.

Beverly Hills, Cal., 150 tons, post office, to Pacific Coast Steel Corpn.

NEW REINFORCING BAR PROJECTS

State of New Jersey, 1016 tons, highway construction, route 29, section 10B, Newark.

State of New Jersey, 650 tons, viaduct, route 21, section 1, over Pennsylvania Railroad yards at Newark; bids March 12.

State of New Jersey, 160 tons, highway construction, route 29, section 3A; bids March 13.

Stapleton, N. Y., 300 tons, United States Marine hospital; Dyer Construction Co., general contractor.

Lancaster, Pa., 800 tons, filtration plant; Thomas Burke, Philadelphia, general contractor.

Ambridge, Pa., 115 tons, filtration plant; Patterson Engineering Corpn., Detroit, general contractor.

Alhambra, Cal., 500 tons, department store, bids under advisement.

Zinc Bookings of 4300 Tons Largest in Many Weeks

Spot Straits Tin in Good Demand; Lead Featureless—Copper Steady and Unchanged

NEW YORK, Feb. 28.—The parade of recent unfavorable developments has failed to shake the steady position of the domestic copper market. While consumer interest here does not extend usually beyond small, spot lots, the Connecticut basis of 5c. a lb. is holding exceptionally well. European demand for electrolytic was dull throughout the week, with prices fluctuating between 4.95c. to 5c., c.i.f. Continental ports. Japan continues to manifest interest in domestic copper, which has been moving steadily to the Orient in recent months. Active inquiry from Japanese sources up to Saturday led to bookings of about 1000 tons. Reports that the Katanga interests intend to step up their production to 55,000 tons have elicited comment from certain quarters that the increase is planned with an eye on possible expansion in demand outgrowing from increased war activities in the Far East. Japanese producers, on the other hand, are understood to be increasing their own quotas to take care of any bulge in requirements resulting from martial contingencies.

Tin

Continued withdrawals from New York warehouse stocks have tightened further the position of nearby tin. Interest in prompt metal during the week was consequently enlivened to the point where demand virtually exceeded offerings. Despite the strong support from consuming quarters, spot Straits at New York suffered a 25-point setback for the week, mostly in sympathy with a declining London market, having dropped yesterday to 23.20c. a lb. At this level, the market here is apparently firm. Steadiness in sterling is also a feature. Future sterling is particularly strong, a premium of 4¼c. being asked for 90 days. London quotations averaged £2 a ton lower for the week, with this morning's postings £146 5s. for spot standard, £146 17s. 6d. for future standard, and £152 for spot Straits. The Singapore price was also lower today at £150 10s. A further decrease last week of 310 tons brought United Kingdom warehouse stocks down to 28,222 tons. Shipments from the East up to and including Feb. 25 of 3954 tons promise a relatively favorable total for the month.

Lead

Buying during the final week in February reflected no change from the sporadic trading that prevailed earlier in the month. Although sales experienced an occasional spurt, volume for the month probably will not match that for January. A further increase in smelters' stocks in February is therefore considered inevitable. Consumption of lead in recent months has been dropping faster than production, so that further curtailment in output will be necessary to adjust the existing unbalance. Some observers hold that additional shrinkage in output is a likely prospect this spring. Although the market position, as well as the statistical condition, lacks any favorable aspects, the leading smelters are adhering firmly to recent prices of 2.87½c., St. Louis, and 3c., New York.

Zinc

Sales during the past week, at 4300 tons, were the largest in many weeks. Consumers, evidently satisfied that the price had reached the low point at least for the current movement, covered freely, with some bookings having been placed for shipment as far ahead as the end of May. An added stimulus to the present situation is a steady condition in the Joplin ore district. Prime Western zinc has consequently enjoyed rising values during the week. The market today is quotable at 2.67½c., East St. Louis, or 3.04½c., New York. Some business is reported at 2.70c., East St. Louis. Foreign dispatches today revealed a renewal of the International Zinc Cartel, which has fixed member production quotas at 45 per cent of capacity, with indemnities to be paid by those producing in excess of the stipulated quota.

Copper Averages

The average price of Lake copper for January, based on daily quotations in THE IRON AGE, was 5c., delivered New York. The average price of electrolytic copper for that month was 4.75c., refinery, or 5c. delivered Connecticut.

In its annual report for 1932 the Sharon Steel Hoop Co., Sharon, Pa., announces it now has for the market a complete line of enameled steel kitchen sinks and it has under process of development a full line of kitchen and bathroom equipment. These new products are in line with the development work that has been in progress for some time on specialties made by its subsidiary, the Youngstown Pressed Steel Co.

The Week's Prices. Cents Per Pound for Early Delivery

	Feb. 23	Feb. 24	Feb. 25	Feb. 27	Feb. 28
Electrolytic copper, N. Y.*	4.75	4.75	4.75	4.75	4.75
Lake copper, New York	5.00	5.00	5.00	5.00	5.00
Straits tin, Spot, N. Y.	23.40	23.30	23.20	23.20	...
Zinc, East St. Louis	2.62½	2.65	2.65	2.67½	2.67½
Zinc, New York	2.99½	3.02	3.02	3.04½	3.04½
Lead, St. Louis	2.87½	2.87½	2.87½	2.87½	2.87½
Lead, New York	3.00	3.00	3.00	3.00	3.00

* Refinery quotations price ¼c. higher delivered in Connecticut.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.62½c. a lb., New York.
Brass ingots, 85-5-5-5, 5.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	25.50c. to 26.50c.
Tin, bar	27.50c. to 29.50c.
Copper, Lake	7.50c. to 8.50c.
Copper, electrolytic	7.25c. to 8.25c.
Copper, casting	7.00c. to 8.00c.
*Copper sheets, hot-rolled	13.62½c.
*High brass sheets	11.00c.
*Seamless brass tubes	13.25c.
*Seamless copper tubes	12.37½c.
*Brass rods	8.50c.
Zinc, slabs	4.37½c. to 4.87½c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	3.75c. to 4.25c.
Lead, bar	5.25c. to 6.25c.
Lead, sheets	6.75c.
Antimony, Asiatic	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	16.00c.
Solder, ½ and ½	15.50c. to 16.50c.
Babbitt metal commercial grade	21.00c. to 32.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	27.25c.
Tin, bar	29.25c.
Copper, Lake	6.125c.
Copper, electrolytic	6.125c.
Copper, casting	5.875c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	3.75c. to 4.00c.
Lead, bar	7.25c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	16.50c.
Babbitt metal, high grade	31.25c.
Solder, ½ and ½	17.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	3.75c.	4.375c.
Copper, hvy. and wire	3.50c.	4.25c.
Copper, light and bottoms	2.625c.	3.50c.
Brass, heavy	1.625c.	2.25c.
Brass, light	1.25c.	1.875c.
Hvy. machine composition	2.50c.	3.00c.
No. 1 yel. brass turnings	2.125c.	2.625c.
No. 1 red brass or compos. turnings	2.375c.	2.875c.
Lead, heavy	2.125c.	2.50c.
Zinc	1.25c.	1.625c.
Cast aluminum	3.75c.	5.00c.
Sheet aluminum	8.00c.	9.75c.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
f.o.b. Pittsburgh mill	1.60c.
f.o.b. Chicago	1.70c.
Del'd Philadelphia	1.91c.
Del'd New York	1.95c.
Del'd Detroit	1.80c.
f.o.b. Cleveland	1.65c.
f.o.b. Lackawanna	1.70c.
f.o.b. Birmingham	1.75c.
C.l.f. Pacific ports	2.10c.

Billet Steel Reinforcing
(as quoted by distributors)

f.o.b. P'gh mills, 40, 50, 60-ft.	1.40c
f.o.b. Birmingham, mill lengths	1.65c.
f.o.b. Cleveland	1.40c.

Rail Steel

f.o.b. mills, east of Chicago dist.	1.30c.
f.o.b. Chicago Heights mills	1.50c.

Iron

Common iron, f.o.b. Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.86c.
Common iron, del'd New York	1.90c.

Tank Plates

	Base per Lb.
f.o.b. Pittsburgh mill	1.60c.
f.o.b. Chicago	1.70c.
f.o.b. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.6935c. to 1.7935c.
f.o.b. Coatesville	1.50c. to 1.70c.
f.o.b. Sparrows Point	1.50c. to 1.70c.
Del'd New York	1.698c. to 1.798c.
C.l.f. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Structural Shapes

	Base per Lb.
f.o.b. Pittsburgh mill	1.60c.
f.o.b. Chicago	1.70c.
f.o.b. Birmingham	1.75c.
f.o.b. Lackawanna	1.70c.
f.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7495c.
Del'd New York	1.86775c.
C.l.f. Pacific ports (standard)	2.10c.
C.l.f. Pacific ports (wide flange)	2.20c.

Steel Sheet Piling

	Base per Lb.
f.o.b. Pittsburgh	1.90c.
f.o.b. Chicago mill	2.05c.
f.o.b. Buffalo	2.00c.

Alloy Steel Bars

(f.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)

Alloy Quantity Bar Base, 2.45c. to 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2000 (½% Nickel)	$0.25
2100 (1½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and Squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh mill	1.70c.
Bars, f.o.b. Chicago	1.75c.
Bars, Cleveland	1.75c.
Bars, Buffalo	1.75c.
Bars, Detroit	1.90c.
Bars, eastern Michigan	1.95c.
Shafting, ground, f.o.b. mill, 1¼ in.	3.00c.
1-3/16 to 1¼ in.	2.50c.
1-9/16 to 1¾ in.	2.35c.
1-15/16 to 2⅞ in.	2.20c.
2-15/16 to 6 in.	2.05c.

*In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh	1.45c. to 1.50c.
No. 10, f.o.b. Chicago mill	1.55c.
No. 10, del'd Philadelphia	1.76c. to 1.81c.
No. 10, f.o.b. Birmingham	1.60c. to 1.65c.
No. 10, c.l.f. Pacific Coast ports	2.17½c.

Hot-Rolled Annealed

No. 10, Pittsburgh	1.60c. to 1.70c.
No. 10, Chicago mills	1.70c.
No. 10, Birmingham	1.75c. to 1.80c.
No. 10, Pacific Coast ports	2.32½c.
No. 10, wrought iron, Pittsburgh	3.60c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.00c.
No. 24, f.o.b. Chi'o mills	2.00c. to 2.10c.
No. 24, del'd Philadelphia	2.31c.
No. 24, f.o.b. Birmingham	2.15c.
No. 24, c.l.f. Pacific Coast ports	2.85c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh,	1.85c. to 1.95c.
No. 10 gage, f.o.b. Chicago mills,	1.95c. to 2.05c.
No. 10 gage, del'd Philadelphia,	2.16c. to 2.26c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh,	2.25c. to 2.30c.
No. 20 gage, f.o.b. Chicago mills,	2.40c. to 2.50c.
No. 20 gage, del'd Philadelphia,	2.61c. to 2.71c.

Note: Automobile body stock and steel furniture sheets to be quoted henceforth on cold-rolled sheet base prices, with extras for drawing quality.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.50c. to 2.60c.
No. 24, f.o.b. Chicago mills	2.50c.
No. 24, del'd Philadelphia	2.81c. to 2.91c.
No. 24, f.o.b. Birmingham	2.65c. to 2.75c.
No. 24, c.l.f. Pacific Coast ports,	3.25c. to 3.50c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh	2.60c. to 2.70c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh	2.40c. to 2.50c.
No. 20, f.o.b. Pittsburgh	2.90c. to 3.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.30c.
No. 28, Chicago mill	2.40c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$9.50
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.10
30-lb. coating I.C.	14.90
40-lb. coating I.C.	16.70

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	1.45c.
All widths up to 24 in., Chicago	1.45c. to 1.55c.
Cooperage stock, P'gh	1.55c. to 1.60c.
Cooperage stock, Chicago	1.65c. to 1.70c.

Cold-Rolled Strips

F.o.b. Pittsburgh	1.80c. to 2.00c.
F.o.b. Cleveland	1.80c. to 2.00c.
Del'd Chicago	2.20c. to 2.30c.
F.o.b. Worcester	2.00c. to 2.10c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	2.55c. to 2.65.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

Extras of 10c. a 100 lb. on mixed and joint carloads, 20c. on pool carloads and 30c. on less than carloads are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.

To Manufacturing Trade

Bright wire	2.10c.
Spring wire	3.10c.

To Jobbing Trade

	Base per Keg
Standard wire nails	$1.85
Smooth coated nails	1.85
Galvanized nails	3.20
	Base per 100 Lb.
Smooth annealed wire	$2.25
Smooth galvanized wire	2.60
Polished staples	2.55
Galvanized staples	2.90
Barbed wire, galvanized	2.35
Woven wire fence No. 9 gage, per net ton	$50.00
Woven wire fence, No. 12½ gage and lighter, per net ton	55.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Wrought Iron Inches	Black	Galv.
⅛	51½	28½	⅛	+95	+142½
¼ to ⅜	57	34	¼ & ⅜	+5	+29½
½	62	49½	½	28	10½
¾	65½	55	¾	33	16¼
1 to 3	67½	57	1 & 1¼	36	20½
			1½	40	23
			2	38	21

Lap Weld

2	61	50½	2	26	12½
2½ to 6	64½	54	2½ to 3½	33	18½
7 and 8	62	51	4 to 6	35	22
9 and 10	60	49	7 and 8	34	21½
11 and 12	59	48	9 to 12	31	16½

Butt Weld, extra strong, plain ends

⅛	48	33	⅛	+17	+49½
¼ to ⅜	53½	38½	¼ & ⅜	+7	+41
½	59	49½	½	28	12½
¾	63½	54	¾	33	17½
1 to 1½	65½	56	1 to 2	39	23
2 to 3	66½	57			

Lap Weld, extra strong, plain ends

2	59	49½	2	34	18½
2½ to 4	62½	53	2½ to 4	39	25
4½ to 6	62	52½	4½ to 6	38	24
7 to 8	58	47	7 & 8	36	22
9 and 10	51½	40¼	9 to 12	26	13½
11 and 12	50½	39½			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—4½ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3½ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	$40.00
Light (from billets), f.o.b. mill	30.00
Light (from rail steel, f.o.b. mill)	26.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.40
Spikes, ½-in. and larger	2.40
Spikes, boat and barge	2.60
Tie plates, steel	1.75
Angle bars	2.55
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, per 100 count)	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	75
Carriage bolts	75
Lag bolts	75
Plow bolts, Nos. 1, 2, 3 and 7 heads	75
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagons	75
C.p.c. and t. square or hex nuts, blank or tapped	75
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	75
Semi-finished hexagon castellated nuts, S.A.E.	75
Stove bolts in packages, P'gh	75, 25 and 10
Stove bolts in packages, Ch'go	75, 25 and 10
Stove bolts in pkgs., Cleveland	75, 25 and 10
Stove bolts in bulk, P'gh	86
Stove bolts in bulk, Chicago	86
Stove bolts in bulk, Cleveland	86
Tire bolts	60 and 10

Discounts of 75 per cent off on bolts and nuts applies on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per Lb.
F.o.b. Pittsburgh or Cleveland	$2.25
F.o.b. Chicago	2.35

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 10
F.o.b. Cleveland	70, 10 and 10
F.o.b. Chicago	70, 10 and 10

Cap and Set Screws

Discounts to Jobbers

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	80 and 25
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller	75 and 10
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	80, 25 and 10
Upset set screws, sq. head, 1 in. dia. and smaller	75, 10 and 10
Upset set screws, 1¼ in. and larger	75 and 10
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. to 6-in., inclusive, Pittsburgh	$26.00
Rerolling, 4-in. to 6-in., inclusive, Youngstown	26.00
Rerolling, 4-in. to 6-in., inclusive, Cleveland	26.00
Rerolling, 4-in. to 6-in., inclusive, Chicago	26.00
Forging quality, Pittsburgh	31.00
Forging quality, Youngstown	31.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

Slabs

(3 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

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Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	36.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$1.75 to $2.00
Foundry, f.o.b. Connellsville Prompt	2.50 to 4.25
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	8.50
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry, by-products, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.00 to $1.15
Mine run coking coal, f.o.b. W. Pa.	1.10 to 1.25
Gas coal, ¾-in., f.o.b. Pa. mines	1.25 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.20 to 1.30
Steam slack, f.o.b. W. Pa. mines	0.25 to 0.35
Gas slack, f.o.b. W. Pa. mines	0.35 to 0.45

Fuel Oil

Per Gal f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 2 industrial fuel oil	2.80c. to 2.90c.
No. 5 industrial fuel oil	2.45c. to 2.50c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.25c.
No. 4 industrial	4.75c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works: High-heat Duty Brick	Intermediate Duty Brick
Penn.	$35.00	$25.00 to $30.00
Maryland	35.00	25.00 to 30.00
New Jer.	$44.00 to 57.00	
Ohio	35.00	25.00 to 30.00
Kentucky	35.00	25.00 to 30.00
Missouri	35.00	30.00
Illinois	35.00	25.00 to 30.00
Ground fire clay, per ton	6.50	

Chrome Brick

	Per Net Ton
Standard size	$42.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$61.50
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$41.40
4-in., del'd Chicago	44.40
6-in., and larger, del'd New York	35.30
4-in., del'd New York	38.30
6-in., and larger, Birm'ham	33.00
4-in., Birmingham	36.00

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per Gross ton, f.o.b. Valley furnace:

Basic	$13.50
Bessemer	15.00
Gray Forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.00
Malleable	$14.50 to 15.00
Low phos., copper free	23.00 to 25.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:

Basic	$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$15.50
N'th'n No. 1 fdy.	16.00
Malleable, not over 2.26 sil.	15.50
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
Low phos., sil. 1 to 2, Copper free.	25.00
Silvery, sil. 8 per cent	23.67
Bess. ferrosil'n, 15 per cent.	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd St. Louis	$17.80 to 18.30
Southern No. 2 fdy. del'd.	14.56
Northern malleable, del'd.	17.80 to 18.30
Northern basic, del'd.	17.80 to 18.30

Freight rates 83c. (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

* Buffalo, No. 2, del'd east N. J.	$17.41 to $17.66
East Pa. No. 2 fdy.	14.02
East Pa. No. 2X fdy.	14.52

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

* Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd.	23.41

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	$17.01 to 17.59
S'th'n Ohio silvery, 8%	21.02

Freight rates, $2.02 from Ironton and Jackson, Ohio; $3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$15.00
S'th'n fdy. sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.00
Ohio silvery, 8 per cent	21.87
Stand. low. phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; $3.12 from Jackson, Ohio; $6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$13.34 to $13.84
East. Pa. No. 2X	13.84 to 14.34
East. Pa. No. 1X	14.34 to 14.84
Basic (del'd east. Pa.)	13.50 to 14.06
Malleable	14.74 to 18.04
Stand. low phos. (f.o.b. east. Pa. furnace)	20.00 to 21.00
Cop. b'r'g low phos. (f.o.b. furnace)	20.00 to 21.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.05
*Buffalo, sil. 2.25 to 2.75	19.05
†Buffalo, sil. 1.75 to 2.25	17.41
†Buffalo, sil. 2.25 to 2.75	17.41
†Ala., sil. 1.75 to 2.25	15.64
†Ala., sil. 2.25 to 2.75	16.14

Freight rates: $5.05 all rail from Buffalo, and $3.41 to $3.91 rail and water from Buffalo when $1 barge and $2 to $2.50 New England freight rate are obtainable; $5.64 rail and water from Alabama to New England seaboard.

* All-rail rate.

† Rail-and-water rate.

CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.75	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	*$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	68.00

*Contract price; spot quotation $61.

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$24.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$20.50	14%	$23.50
11%	21.00	15%	24.00
12%	21.50	16%	25.00
13%	22.50	17%	26.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$18.00	12%	$20.50
7%	18.50	13%	21.50
8%	18.75	14%	22.50
9%	19.00	15%	23.00
10%	19.50	16%	24.00
11%	20.00	17%	25.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	94c.
Ferrotungsten, less carloads	$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	9.5
Ferrochromium, 2% carbon	16.50c. to 17.
Ferrochromium, 1% carbon	17.50c. to 18.
Ferrochromium, 0.10% carbon	19.50c. to 20.
Ferrochromium, 0.06% carbon	20.00c to 20.5
Ferrovanadium, del., per lb. contained Va.	$2.60 to $2.
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace in carloads	160.
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton with $2 unitage	50.
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.
Ferromolybdenum, per lb. Mo., del.	95c
Calcium molybdate, per lb. Mo., del.	85c
Silico spiegel, per ton, f.o.b. furnace, car lots	$36.
Ton lots or less, per ton	41.
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.
2% carbon grade	90.
1% carbon grade	100.
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.
Old range, non-Bessemer, 51.50% iron	4.
Mesabi Bessemer, 51.50% iron	4.
Mesabi non-Bessemer, 51.50% iron	4.
High phosphorus, 51.50% iron	4.

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.
Iron, low phos., Swedish, average 68½% iron	9c.
Iron, basic or foundry, Swedish, average 65% iron	8c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	8c.
Manganese, Caucasian, washed 52%	*22c.
Manganese, African, Indian, 50-52%	*21c. to 22c.
Manganese, Brazilian, 46 to 48%	*12c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid	$10.

	Per Gross Ton
Tungsten, domestic scheelite	$8.00 to $10.
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic seaboard	16.
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic seaboard	18.

* Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	$9.00 to $9.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	$11.00 to 11.50
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	$16.00 to 16.75
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$8.00 to $9.00
No. 2 heavy melting steel	7.25 to 7.75
No. 2 railroad wrought	8.50 to 9.00
Scrap rails	8.50 to 9.00
Rails 3 ft. and under	10.00 to 10.50
Sheet bar crops, ordinary	9.00 to 9.50
Compressed sheet steel	8.25 to 8.75
Hand bundled sheet steel	7.25 to 7.75
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	6.25 to 6.75
Short shov. steel turnings	6.25 to 6.75
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
Cast iron carwheels	8.00 to 8.50
Heavy breakable cast	8.00 to 8.50
No. 1 cast	8.50 to 9.50
Railr. knuckles and couplers	9.00 to 10.00
Rail, coil and leaf springs	9.00 to 10.00
Rolled steel wheels	9.00 to 10.00
Low phos. billet crops	10.50 to 11.00
Low phos. sheet bar crops	10.50 to 11.00
Low phos. plate scrap	9.50 to 10.00
Low phos. punchings	**10.00 to 10.50**
Steel car axles	10.00 to 10.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$5.00 to $5.50
Shoveling steel	5.00 to 5.50
Frogs, switches and guards	$5.00 to $5.50
Hydraulic comp. sheets	4.00 to 4.50
Drop forge flashings	4.00 to 4.50
No. 1 busheling	3.50 to 4.00
Rolled carwheels	7.00 to 7.50
Railroad tires	8.00 to 8.50
Railroad leaf springs	7.75 to 8.25
Axle turnings	4.50 to 5.00
Steel couplers and knuckles	7.00 to 7.50
Coil springs	7.25 to 8.75
Axle turnings (elec. fur.)	5.50 to 6.00
Low phos. punchings	8.00 to 8.50
Low phos. plates, 12 in. and under	8.00 to 8.50
Cast iron borings	3.25 to 3.75
Short shoveling turnings	3.25 to 3.75
Machine shop turnings	3.00 to 3.50
Rerolling rails	7.50 to 8.00
Steel rails, less than 3 ft.	7.50 to 8.00
Steel rails, less than 2 ft.	8.00 to 8.50
Angle bars, steel	7.00 to 7.50
Cast iron carwheels	5.50 to 6.00
Railroad malleable	5.00 to 5.50
Agricultural malleable	
* Relaying rails, 56 to 60 lb.	15.00 to 17.00
* Relay rails, 65 lb. and up	18.00 to 23.00

Per Net Ton

Iron angle and splice bars	$5.00 to $5.50
Iron arch bars, transoms	5.00 to 5.50
Iron car axles	11.00 to 11.50
Steel car axles	8.50 to 9.00
No. 1 railroad wrought	4.50 to 5.00
No. 2 railroad wrought	4.50 to 5.00
No. 1 busheling	2.50 to 3.00

No. 2 busheling	$2.00 to	$2.50
Locomotive tires, smooth	7.50 to	8.50
Pipe and flues	1.25 to	1.75
No. 1 machinery cast	6.25 to	6.75
Clean automobile cast	7.25 to	7.75
No. 1 railroad cast	5.75 to	6.25
No. 1 agricultural cast	5.75 to	6.25
Stove plate	5.50 to	6.00
Grate bars	6.25 to	6.75
Brake shoes	6.00 to	6.50

* Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$6.50 to	$7.00
No. 2 heavy melting steel	5.00 to	5.50
No. 1 railroad wrought	7.50 to	8.00
Bundled sheets	4.00 to	4.50
Hydraulic compressed, new	5.50 to	6.00
Hydraulic compressed, old	4.00 to	4.50
Machine shop turnings	3.50 to	4.00
Heavy axle turnings	5.50 to	6.00
Cast borings	3.50 to	3.75
Heavy breakable cast		8.00
Stove plate (steel works)	5.50 to	6.00
No. 1 low phos. heavy	10.00 to	10.50
Couplers and knuckles	8.00 to	8.50
Rolled steel wheels	8.00 to	8.50
No. 1 blast furnace	3.50 to	3.75
Spec. iron and steel pipe	6.50 to	7.00
Shafting	12.00 to	13.00
Steel axles	12.00 to	13.00
No. 1 forge fire	5.50 to	6.00
Cast iron carwheels	8.00 to	8.50
No. 1 cast	8.00 to	9.00
Cast borings (chem.)	8.00 to	10.00
Steel rails for rolling	9.00 to	9.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.00 to	$7.25
No. 2 heavy melting steel	6.25 to	6.50
Compressed sheet steel	6.00 to	6.50
Light bundled sheet stampings	4.00 to	4.50
Drop forge flashings	5.25 to	5.75
Machine shop turnings	4.00 to	4.25
Short shoveling turnings	4.00 to	4.50
No. 1 busheling	5.25 to	5.50
Steel axle turnings	5.00 to	5.50
Low phos., billet crops	10.00 to	11.00
Cast iron borings	4.50 to	5.00
Mixed borings and short turnings	4.50 to	5.00
No. 2 busheling	4.50 to	4.75
No. 1 cast	7.00 to	7.50
Railroad grate bars	5.00 to	5.50
Stove plate	5.00 to	5.50
Rails under 3 ft.	8.50 to	9.00
Rails for rolling	8.50 to	9.00
Railroad malleable	6.75 to	7.00
Cast iron carwheels		8.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$7.00 to	$7.25
No. 2 heavy melting scrap	5.50 to	6.00
Scrap rails	6.00 to	6.50
New hydraul. comp. sheets	5.50 to	6.00
Old hydraul. comp. sheets		5.00
Drop forge flashings	5.50 to	6.00
No. 1 busheling	5.50 to	6.00
Hvy. steel axle turnings		6.00
Machine shop turnings	4.00 to	4.50
Knuckles and couplers		9.00
Coil and leaf springs		9.00
Rolled steel wheels		9.00
Low phos. billet crops	9.00 to	9.50
Short shov. steel turnings	5.50 to	6.00
Short mixed borings and turnings	3.75 to	4.25
Cast iron borings	3.75 to	4.25
No. 2 busheling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	10.00 to	11.00
No. 1 machinery cast	9.50 to	10.00
No. 1 cupola cast	8.50 to	9.00
Stove plate	7.00 to	7.50
Steel rails, 3 ft. and under	8.50 to	9.00
Cast iron carwheels	8.00 to	9.00
Industrial malleable	7.00 to	7.50
Railroad malleable	7.00 to	7.50
Chemical borings	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.00 to	$7.50
Scrap steel rails	7.00 to	7.50
Short shoveling turnings		4.00
Stove plate		6.00
Steel axles		9.00
Iron axles		9.00
No. 1 railroad wrought	4.50 to	5.00
Rails for rolling	7.50 to	8.00
No. 1 cast		8.50
Tramcar wheels		8.50
Cast iron borings, chem.		8.50

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$5.50 to	$6.00
No. 1 heavy melting	4.50 to	5.00
No. 2 heavy melting	4.75 to	5.25
No. 1 locomotive tires	5.00 to	5.50
Misc. stand-sec. rails	5.50 to	6.00
Railroad springs	6.00 to	6.50
Bundled sheets	2.00 to	2.50
No. 2 railroad wrought	5.00 to	5.50
No. 1 busheling	3.50 to	4.00
Cast iron borings and shoveling turnings	2.75 to	3.25
Rails for rolling	6.75 to	7.25
Machine shop turnings	2.00 to	2.50
Heavy turnings	3.00 to	3.50
Steel car axles	8.50 to	9.00
Iron car axles	11.00 to	11.50
Wrot. iron bars and trans.	4.00 to	4.50
No. 1 railroad wrought	3.50 to	4.00
Steel rails less than 3 ft.	7.00 to	7.50
Steel angle bars	6.00 to	6.50
Cast iron carwheels	5.00 to	5.50
No. 1 machinery cast	6.50 to	7.00
Railroad malleable	4.00 to	4.50
No. 1 railroad cast	6.25 to	6.75
Stove plate	6.00 to	6.50
Relay, rails, 60 lb. and under	16.00 to	16.50
Relay, rails, 60 lb. and over	$20.00 to	$21.00
Agricult. malleable	4.00 to	4.50

BOSTON

Dealer's buying prices per gross ton:

No. 1 heavy melting steel	$3.00 to	$3.25
Scrap T rails	2.50 to	2.75
Machine shop turnings	0.80 to	1.00
Cast iron borings		1.05
Bundled skeleton, long	2.00 to	2.10
Forge flashings	3.00 to	3.50
Blast furnace scrap	0.90 to	1.00
Forge scrap	3.00 to	3.25
Shafting	9.50 to	10.00
Steel car axles	9.00 to	9.50
Wrought pipe	4.00 to	4.25
Rails for rolling	4.50 to	5.00
Cast iron borings, chemical	7.00 to	7.25
Per gross ton delivered consumers' yards:		
Textile cast	$7.00 to	$7.50
No. 1 machinery cast	7.50 to	8.00
Stove plate	5.00 to	5.25
Railroad malleable	8.00 to	8.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$3.50 to	$5.00
No. 2 heavy melting steel	3.50 to	4.00
Heavy melting steel (yard)		1.50
No. 1 heavy breakable cast	5.00 to	5.25
Stove plate (steel works)	2.50 to	2.90
Machine shop turnings	0.75 to	1.25
Short shoveling turnings	0.75 to	1.25
Cast borings	0.50 to	1.00
No. 1 blast furnace	0.50 to	1.00
Steel car axles	8.00 to	8.50
Spec. iron and steel pipe	$2.50 to	$2.75
Forge fire	2.75 to	3.00
No. 1 railroad wrought	4.00 to	4.50
No. 1 yard wrought long	3.25 to	3.50
Rails for rolling	5.00 to	5.50
No. 1 cast		4.50
No. 2 cast		4.50
Stove plate (foundry)		4.50
Malleable cast (railroad)	4.00 to	4.50
Cast borings (chemical)	6.00 to	6.50
Per gross ton, delivered local foundries:		
No. 1 machinery cast		$9.00
No. 1 hvy. cast (cupola size)	7.50 to	8.00
No. 2 cast	4.00 to	4.50

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$5.00 to	$5.50
Scrap rails for melting	6.00 to	6.50
Loose sheet clippings	1.00 to	1.50
Bundled sheets	3.75 to	4.25
Cast iron borings	3.00 to	3.50
Machine shop turnings	3.00 to	3.50
No. 1 busheling	4.50 to	5.00
No. 2 busheling	2.75 to	3.25
Rails for rolling	6.50 to	7.00
No. 1 locomotive tires	7.00 to	7.50
Short rails	9.00 to	9.50
Cast iron carwheels	6.50 to	7.00
No. 1 machinery cast	6.50 to	7.00
No. 1 railroad cast	6.00 to	6.50
Burnt cast	4.25 to	4.75
Stove plate	4.25 to	4.75
Agricultural malleable	6.75 to	7.25
Railroad malleable	7.00 to	7.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting steel	$4.50 to	$5.00
Borings and short turnings	2.50 to	3.00
Long turnings	2.25 to	2.75
No. 1 machinery cast	7.75 to	8.25
Automotive cast	8.00 to	8.50
Hydraul. comp. sheets	4.00 to	4.50
Stove plate	3.00 to	3.50
New No. 1 busheling	3.75 to	4.25
Old No. 2 busheling	1.50 to	2.00
Sheet clippings	1.25 to	1.75
Flashings	2.75 to	3.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels	10.00	8.50
Malleable	10.00	8.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	2.95c.
Squares and flats	3.45c.
Hoops and bands, under ¼ in.	2.95c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.10c.
Galv. sheets (No. 24), 25 or more bundles	3.35c.
Hot-rolled sheets (No. 10)	2.65c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	$3.61
Spikes, large	2.40c.
Small	2.65c.
Boat	2.90c.
Track bolts, all sizes, per 100 count, 70 per cent off list.	
Machine bolts, 100 count, 70 per cent off list.	
Carriage bolts, 100 count, 70 per cent off list.	
Nuts, all styles, 100 count, 70 per cent off list.	
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd base per 100 lb.	2.65
Wire, galv. soft, base per 100 lb.	3.10
Common wire nails, per keg	2.20
Cement coated nails, per keg	2.20

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforc. bars, billet steel	1.35c. to 1.40c.
Rail steel reinforment	1.15c. to 1.25c.
Cold-fin. steel bars and shafting Rounds and hexagons	3.00c.
Flats and squared	3.50c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.45c.
Galv. sheets (No. 24)	3.50c.
Hot-rolled sheets (No. 10)	3.20c.
Spikes (3/16 in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural (keg lots)	2.75c.
Rivets, boiler (keg lots)	2.75c.
	Per Cent Off List
Machine bolts	65
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq., tap. or blank	65
Hot-pressed nuts, hex., tap. or blank	65
Hex. head cap screws	80 and 10
Cup point set screws	75 and 10
Flat head bright wood screws	52½ and 10
Spring cotters	60
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

NEW YORK

	Base per Lb.
Plates and struc. shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	5.90c. to 6.25c.
Cold-fin. shafting and screw stock; Rounds and hexagons	3.54c.
Flats and squares	4.04c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.30c.
Bands	3.30c.
Hot-rolled sheets (No. 10)	3.00c.
Hot-rolled ann'l'd sheets (No. 24*)	3.25c.
Galvanized sheets (No. 24*)	3.75c.
Long terne sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel ⅝ x ⅛ in. and larger; Smooth finish, 1 to 2½ x ¼ in. and larger	3.40c. 3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.60
	Per Cent Off List
Machine bolt, cut thread: ¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread: ½ x 6 in. and smaller	65 to 65 and 10
⅝ x 20 in. and smaller	65 to 65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.36c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10 up to and inc. 48 in. wide	3.00c.
over 48 in. wide	3.15c.
Black corrug. sheets (No. 24)	3.75c.
Gal. corrug. sheets	4.05c.
Structural rivets	4.00c.
Boiler rivets	4.00c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.45c.
*Structural shapes	2.45c.
*Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-finished steel bars	3.35c.
*Steel hoops	3.00c.
*Steel bands, No. 12 to 3/16 in., incl.	2.75c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No. 24)	3.15c.
†Galvanized sheet (No. 24)	3.50c.
*Hot-rolled annealed sheets (No. 10)	2.70c.
Diam. nat. floor plates, ¼ in.	5.00c.
Swedish iron bars	5.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

* Base prices subject to deductions on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex.	2.95c.
Cold-fin. flats and sq.	3.45c.
Flat rolled steel under ¼ in.	3.00c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.50c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.10

* Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rails steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex.	3.32c.
Squares and flats	3.82c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$15.87
4-in.	34.57
Lap-welded steel boiler tubes, 2-in.	15.12
4-in.	32.96

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.20c.
Soft steel bars	.95c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.50c.
Rounds and hex.	3.00c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.05c.
Bands	3.30c.
Hoops	3.95c.
Hot-rolled sheets (No. 10)	3.45c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.25

BOSTON

	Per Lb.
*Beams, channels, angles, tees, zees	3.00c.
*H beams and shapes	3.00c.
*Plates—sheared, tank, and univ. mill, ¼ in. thick and heavier	3.00c.
Floor plates, diamond pattern	5.25c.
*Bar and bar shapes (mild steel)	2.90c.
*Bands 3/16 in. thick and No. 12 ga. incl.	3.40c.
Hoops, No. 14 ga. and lighter	4.90c. to 5.40c.
*Half rounds, hf. ovals, ovals and bevels	4.15c.
Tire steel, rd. edge 1½ x ½ in. and larger	4.50c.
Smaller sizes	4.75c.
Cold-finished rounds and hexagons	3.60c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.10c.
*Blue annealed sheets No. 10 ga.	3.15c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Blued stove pipe sheets No. 24 ga.	3.90c.
Galvanized steel sheets No. 24 ga.	4.00c.
Lead coated (long ternes) No. 24 ga.	5.00c.

* Base prices for 15,000 lb. orders, extras apply for smaller quantities.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates and struc. shapes, ¼-in. and heavier	3.15c.	3.30c.	3.00c.
Soft steel bars	3.15c.	3.30c.	3.00c.
*Reinforcing bars	3.00c.	3.00c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.90c.	4.20c.	4.50c.
Hot-rolled sheets (No. 10)	3.37½c.	3.80c.	3.80c.
Galv. sheets (No. 24)	4.55c.	4.50c.	5.00c.
*Struc. rivets, ½ in. and larger, less than 100 lb.	5.75c.	6.00c.	5.25c.
*Cold finished steel Rounds	5.50c.	5.50c.	5.50c.
Squares and hexagons	6.75c.	6.75c.	6.75c.
Flats	7.25c.	7.25c.	7.25c.
Nails—base per keg less carload:			
Com. 4-60d.	$2.40	$2.40	$2.40
S. ox 4-20d.	2.40	2.45	2.45
Finish 6 & 8d.	2.40	2.40	2.40
All others	2.65	2.65	2.65

* Subject to deductions for quantity.

New Administration Must Plunge Into Problems

(*Concluded from Page* 366)

ing the Administration program for the world economic conference. There are many skeptics as to constructive results of the forthcoming conference, though the possibilities of higher world prices of commodities and stabilized currencies are seen by its proponents. More liberal exchange regulations, modification of world tariffs, etc., are to be taken up also. Another matter that will be pressed upon Secretary Hull will be that of recognizing Soviet Russia. There are strong forces both for and against recognition, but Mr. Roosevelt has not made clear his position. Nor is the attitude of the new Congress known at this time.

Inflation that may be brought about under the Roosevelt regime apparently will be through expansion of credit fitted in with relief programs through Reconstruction Finance Corporation loans. The fact remains, however, that even some of its original adherents are turning against the Reconstruction Finance Corporation. It was only recently the organization was the object of vigorous criticism by the most prominent Democrat in the Senate, Carter Glass of Virginia, a strong Roosevelt supporter, though an independent and fearless thinker.

On railroad problems, the Roosevelt idea seems to favor aid through the R. F. C. or other means, with a cutting down of their financial structures. Coordination of different forms of transportation appears to be in the cards, and would partially fit recommendations made not only by previous administrations but the railroads and shippers generally. Farm legislation proposed evidently will be a wide-sweeping program, covering such matters as price and mortgage relief, Government purchase or lease of marginal acreage, which would be removed from competition and would be reforested, etc. Price fixing is said to be opposed strongly.

The Glass bill which recently passed the Senate is considered an important move toward a unified national banking system, and legislation of this sort is expected to have the support of the new administration. Reorganization of the Federal Power Commission, further Federal regulation of interstate transmission of power and gas and even Government ownership, such as proposed for Muscle Shoals, seem to be in prospect for recommendation regarding public utilities by the new administration. Liberalized anti-trust laws to permit closer cooperation in industry are expected to be proposed also. At the same time such legislation promises to call for Government supervision and perhaps immunity to labor.

Prohibition repeal was favored by Mr. Roosevelt and, since it has passed Congress, it remains for the states to act. The general guess, which may have little or no value, is that ratification lies at least two years in the future.

It is of course sheer nonsense to talk about Mr. Roosevelt being given the powers of a dictator. Such a system in the absence of armed conflict could not endure in the American republic. Mr. Roosevelt will be given wide powers to reorganize the Government, however, according to present indications. And in bringing about such reorganization and in other operations it is conceivable, though not certain, that he will call in the services of prominent men and women in public life, covering finance, industry, business, labor, etc.

Arc Welding Prize Papers Published

Cutting costs by redesigning is the theme of a new book entitled "Designing for Arc Welding," which is being published this week by the Lincoln Electric Co., Cleveland. The book contains the prize winning papers of the $17,500 second Lincoln prize competition, in which some 400 papers were submitted. It consists of approximately 450 pages, 6 x 9 in., and is divided into five sections. These sections and the number of chapters in each are as follows: Machinery, 6; shipbuilding, 2; buildings - bridges - houses, 5; large containers, 3; and piping and fittings, 3. Fundamentals of design are so explained as to make them applicable to other industries.

Use of arc-welded alloys to resist corrosion; substitution of arc-welded steel for aluminum without weight increase; welding high-tensile steels; and structural design for resisting earthquake shocks are among the interesting developments discussed. Papers in the machinery section include: welded 500-ton precision press; electric trucks of arc-welded tube construction; and design of arc-welded fan structures. The chapter on buildings includes papers on arc-welded steel frame houses, and welded steel floors.

Every chapter of the book is written by an authority in the particular field covered, and therefore the book as a whole may be taken to represent outstanding contributions of welding to industry during the past two years. As one of the principal points on which the papers in the competition was judged was the savings in costs made by the use of arc welding, each paper includes actual costs and shows how the savings were effected.

Contributors include Lt. Com. Homer N. Wallin and Lt. Henry A. Schade, United States Navy, winners of the first prize; H. H. Tracy, structural engineer, Southern California Edison Co.; Major G. M. Barnes, ordnance department, United States Army; H. J. L. Bruff, London & North Eastern Railway, London, England; Everett Chapman, Lukenweld, Inc.; W. H. Zorn, Detroit Edison Co.; Raymond Hoffman, Standard Oil Co., of New Jersey; Gustav Wahl, chief naval architect, Deutsche Werke Kiel, Kiel, Germany; K. T. Sorenson, designing engineer, Baldwin-Southwark Corpn., and others.

The book, edited by A. F. Davis, vice-president of the Lincoln Electric Co., is attractively arranged, and is well illustrated with both drawings and photographs. It is bound in cloth-covered boards. The price per copy is $2.50.

Industrial Finances

Sivyer Steel Casting Co. reports $111,144 net loss for 1932 after all charges including depreciation. This compares with $73,963 net loss in 1931.

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National Acme Co., Cleveland, reports a net loss after depreciation and interest charges of $895,458 during 1932 as compared with $1,095,149 in 1931. President F. H. Chapin in a letter to the stockholders said that the reduction of $200,000 in loss as compared with the previous year was due largely to drastic curtailment in expenses.

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Granite City Steel Co. reports a net profit for 1932 of $13,827 after allowance for depreciation, taxes and other charges, equal to 5c. a share on 255,292 shares outstanding. In 1931 the company earned $332,319, or $1.28 a share. Current assets on Dec. 31 last amounted to $3,862,394 including $2,653,938 cash.

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Sharon Steel Hoop Co., Sharon, Pa., had a net operating loss in 1932 of $709,306 with the addition of interest charges and after making allowance for depreciation the total loss for the year amounted to $2,016,269.

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Midvale Co., Philadelphia, reports a net loss for 1932 of $245,782 after provision for depreciation in amount of $460,000. This compares with a net profit in 1931 of $750,115.

Industry's belief in research is exemplified by the experience of the American Society of Mechanical Engineers. Expenditures for research in 1932, coming largely from industry, were approximately $41,000, or only 20 per cent below those of the previous best year—a far better record than could be shown in other industrial activities. The society's research work is carried on by 28 committees made up of some 470 engineers representing manufacturers, users and independent interests.

Metallurgists Discuss Varied Steel Problems

(*Concluded from Page* 359)

erties may be obtained from the ranges and heat treatments studied.

Favor 3 to 5 Per Cent Chromium

It is set forth by the investigators that the physical properties of the 3 and 5 per cent chromium alloys developed interesting possibilities, while those containing 1 and 7 per cent chromium offered no particular advantages over the 3 and 5 per cent types. The latter compositions are demonstrated as capable of soft annealing to develop properties very similar to those of mild-carbon steels, and therefore suitable for equipment where severe cold work is applied during fabrication. Simple air-hardening treatments of these 3 to 5 per cent steels result in remarkably high yield points and tensile strengths, combined with excellent ductility and impact toughness. Many articles of shapes that make quenching in liquid media difficult might be produced from steels containing either 3 or 5 per cent chromium, and subsequently heat treated, without excessive distortion, to desired properties. Variations in elastic ratio are also a feature.

The particular properties of these steels, it is believed, as compared with ordinary air-hardening steels, can be associated with their structures. Most of the S.A.E. steels having air-hardening properties, say the authors, also have a pearlitic structure when soft-annealed. On the other hand, the structures of the 3 to 5 per cent chromium steels rarely exhibit normal pearlite, the carbides usually being of a globular or coalesced type dispersed throughout the ferrite matrix. It is probable that, on hardening or tempering, this tendency toward random dispersion of carbides promotes the high tensile properties and also the high impact toughness which pearlitic steels do not develop. The paper was presented by Mr. Wright.

Other Facts Brought Out

Discussion was initiated by the chairman of the meeting, Dr. F. N. Speller, who said the corrosion properties of these steels had recently been checked with the same results as in the original work. He stated that 3 per cent chromium steels seem to have three times the durability up to 1100 deg., but when the chromium is below 1.50 per cent the benefits are hardly worth considering. These steels, he said, seem to offer a wide number of applications due to the range in physical properties resulting from air treatment. The 3 per cent steels are nearly the same as the 5 per cent. A wide use is in the tubes for oil cracking.

The possible wide applications were further emphasized by Dr. A. B. Kinzel, Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y., who said that, besides their application as tubing in the oil industry, they are now incorporated in rails containing 2 per cent chromium.

Omission of mention by the authors of the creep values of these steels was regretted by Mr. German, Crucible Steel Co. of America, New York. These values are very high for certain temperatures, highest of any steels in recent years. Also 4 to 6 per cent chromium steel with 0.50 to 0.60 per cent molybdenum for tubes is much used. Last year some 3000 tons of this type was produced.

Cutting Efficiency and Hot-Hardness of Tool Steels

AN extensive investigation was reported by E. C. Harder and H. A. Grove of the Battelle Memorial Institute, Columbus, Ohio, in their paper, "Hot-Hardness of High-Speed Steels and Related Alloys." The work is an elaborate attempt to study the possible correlation between hot-hardness and cutting efficiency. Samples of nearly all the high-speed steels and alloys (Stellite), 32 in all, were subjected to tests in the red-heat range in special apparatus described in the paper. Even a partial account of the details of the author's work cannot be given here, but only the conclusions recorded.

There appears to be at least a first order approximation to a correlation between the hot-hardness, as determined by the mutual-indentation method, and the cutting efficiency of high-speed steels. It is appreciated that the cutting efficiency of high-speed steels must depend on several factors, such as the strength and hardness of the matrix at the operating temperature in particular. Work to date indicates that 700 deg. C. (1290 deg. F.) is a critical temperature, but that 650 deg. C. (1200 deg. F.) may be nearly as satisfactory.

The authors believe that the strength and hardness of the matrix are directly indicated by the hardness as determined by the mutual-indentation method and that it should therefore follow that, in cutting efficiency tests in which the test fails because such a high temperature has been developed that the failure results because of low hardness and strength of the matrix, there should be a very definite correlation between cutting efficiency and the hot-hardness.

It has been found that air cooling, as compared with air quenching, gives a much lower order of hot-hardness and it is believed that this same relation may be found in cutting efficiency tests. The hot-hardness curves of the high-speed steels, as contrasted with those of materials of the Stellite type, offer a reasonable explanation for the known superiority of the latter material in certain types of cutting tests. If it can be shown that the hot-hardness tests by the mutual-indentation method, when made at 700 deg. C. (1290 deg. F.), can be depended upon to predict cutting efficiency, this method may be used as a convenient way of determining the best alloy combinations to give hot-hardness consistent with other desirable properties, and it may show that more economical combinations of our alloying elements are possible than are at present being used. There are indications that the efficiency of cobalt beyond 4 to 5 per cent in producing hot-hardness is very low.

Another possible application of this method of determining the hot-hardness is as a means of ascertaining the suitability of materials for service at elevated temperatures and in selecting hot-working temperatures for metals and alloys.

The Two Lectures

THE usual distinctive features of the winter convention were the Howe Memorial and the Institute of Metals lectures. The former, which was the twelfth, was delivered by Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., who chose as his topic, "Steel-Making Processes." He was greeted by a large and distinguished audience and was introduced by Dr. Albert Sauveur of Harvard. The lecture was both a review and a prophecy of the trends in this wide field, as well as an analysis of conditions.

A prominent German scientist delivered the other lecture before the Institute of Metals—Dr. Georg Masing of the Technische Hochschule of Berlin, Germany. It has been the custom to have a prominent foreign metallurgist deliver this lecture every other year. His topic was "Present-Day Problems in Theoretical Metallurgy." He was introduced by Prof. C. H. Mathewson, professor of metallurgy, Yale University, and he had a large audience. A brief extract will be published later.

New Officers

AT the annual meeting of the A. I. M. and M. E., the following officers were elected:

President and director: F. M. Becket, vice-president, Union Carbide & Carbon Corpn., New York.

Vice-presidents and directors: Henry Krumb, consulting mining engineer, Salt Lake City, Utah, and Edgar Rickard, 42 Broadway, New York.

Doctor Becket, the new president, is widely known here and abroad for his outstanding achievements in ferroalloy metallurgy and in the development of chromium and other alloy products.

The new chairman of the Iron and Steel Division is John Johnston, director of research, Research Laboratory, United States Steel Corpn., Kearny, N. J.

The Institute of Metals selected Truman S. Fuller, research laboratory, General Electric Co., as its new chairman, with John L. Christie, W. A. Scheuch and E. M. Wise as vice-chairmen.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Electric Research Products, Inc., 250 West Fifty-seventh Street, New York, manufacturer of radio equipment, telephone apparatus, etc., a subsidiary of Western Electric Co., 195 Broadway, has leased factory at Chicago, totaling about 60,000 sq. ft. floor space, for new plant. It is proposed to have unit ready for service in April.

Metropolitan Cement Corpn., affiliated with Edison Cement Co., 261 Fifth Avenue, New York, plans remodeling and equipment installation in plant in Raritan Township, N. J., formerly property of Eastern Potash Corpn., occupying 47 acre tract. Cost over $300,000. Portion of output will be given over to cement conduits and kindred products. W. D. Cloos is vice-president and general manager.

Safety Signal Corpn., New York, has been organized by William Begley, 625 Beach Sixty-sixth Street, Averne, N. Y., and Charles Begley, 67 West Sixteenth Street, Bayonne, N. J., capital $100,000, to manufacture electric signals and devices.

Constructing Quartermaster, Mitchel Field, L. I., asks bids until March 16 for coal storage and handling system, including coal hopper elevator tip, steel for track support, etc. (Specification 9393-D). Appropriation of $62,200 has been made for work.

City Brewing Corpn., 912 Cypress Avenue, Brooklyn, has let general contract to Walter Kidde Constructors, Inc., 140 Cedar Street, New York, for addition to plant, including improvements in present unit. Cost close to $300,000 with equipment. Frederick Paulsen is secretary and engineer.

Signal Supply Officer, Army Base, Brooklyn, asks bids until March 7 for 3000 ft. submarine cable and two reels (Circular 75); until March 10, 50 capacitors, 80 resistors, 130 switches, 50 output phone jacks, etc. (Circular 70) 16,000 ft. conduit (Circular 79), three to eight power units, 3 kva. (Circular 67).

Gerson Metal Products Co., Inc., Bronx, New York, has been organized by Ray Kornfeld and Sidney Simon, to manufacture metal goods. Company will take over organization of same name at 504 Bryant Avenue, Bronx.

Fidelio Brewery, Inc., 495-13 First Avenue, New York, has let general contract to Henry M. Weitzner, Inc., 225 West Thirty-fourth Street, for plant extensions and improvements. Joseph D. Weiss, 119 West Fifty-seventh Street, is architect.

Commanding Officer, Watervliet Arsenal, Watervliet, N. Y., asks bids until March 10 for aluminum bronze and composition bronze castings (Circular 33).

Amphibions, Inc., Roosevelt Field, Garden City, L. I., is planning to rebuild aircraft hangar, with repair and reconditioning facilities, recently destroyed by fire. Loss over $50,000 with equipment.

Kirtland Electric Construction Co., Albany, N. Y., has arranged for change of name to Albany Metal Forming Works, Inc.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 7 for one motor-driven band resaw, one motor-driven surfacer, electric planer and jointer, and one motor-driven wood-turning lathe (Schedule 9647) for White Plains, N. Y.; 1776 sets wire boiler tube brushes (Schedule 9663), 20,000 lb. manganese bronze (Schedule 9638) for Brooklyn Navy Yard.

James Spence Iron Foundry, Inc., Jersey City, N. J., has been organized by Alexander Spence, Maplewood, N. J., and associates, capital $100,000, to manufacture iron and other metal castings. Company will take over plant and business at 921 Garfield Avenue, heretofore operated under name of James Spence.

Department of Public Works, Princeton, N. J., George M. Brown, superintendent, has plans for new municipal incinerator plant near Rocky Hill. Cost over $45,000 with furnaces, unloading, conveying and other equipment.

Igoe Brothers, 234 Poinier Street, Newark, N. J., manufacturer of wire nails and other wire goods, has awarded general contract to Truscon Steel Co., 155 East Forty-fourth Street, New York, for one-story addition, 40 x 140 ft.

J. & S. Auto Body Works, Inc., Newark, care of Jacob Lubetkin, 60 Park Place, representative, has been organized by Jacob Rekoon, Newark, and associates, to manufacture automobile bodies and operate mechanical repair works.

C. Schmidt & Sons, Inc., 127 Edward Street, Philadelphia, is planning expansion in mechanical bottling department, including installation of additional mechinery. Cost about $70,000.

Public Works Officer, Navy Yard, Philadelphia, asks bids until March 8 for one 7½-ton electric bridge crane for building No. 3 (Specification 7219).

Joseph Hyman & Sons, Inc., Tioga and Livingston Streets, Philadelphia, manufacturer of power presses, parts, etc., has leased one-story factory on Tioga Street for plant.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until March 8 for installation of wrought iron sash and corrugated wire glass, including motors and operators for continuous ventilator sash for foundry building at Philadelphia Navy Yard; alternative proposals ask for galvanized steel sash (Specification 7213).

Bellanca Aircraft Corpn., New Castle, Del., is running with full working force on full time schedule.

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until March 20 for eight sets receiving instruments for anti-aircraft guns; alternate bids on 10 to 13 sets, and spare parts (Circular 301).

New York State Gas & Electric Corpn., South Cayuga Street, Ithaca, N. Y., plans addition to power plant at Shavertown, N. Y., and extensions in power lines in that district. Cost close to $50,000 with equipment.

Binghamton Flexible Shaft Co., Binghamton, N. Y., will immediately rebuild its plant which was destroyed by fire on Feb. 15.

CENTRAL DISTRICT

Gulf Refining Co., Frick Annex, Pittsburgh, is securing property at East St. John, N. B., for new oil refinery. Initial units will have capacity of about 2000 bbl. a day, and will include power house, machine shop and other departments. Bulk storage and distributing plant also will be built. Cost about $100,000 with machinery. Putnam Brothers, Ltd., Houlton, Me., distributer of Gulf oil products in New Brunswick, is interested in project.

Peter Graff & Co., Ltd., Worthington, Pa., operating Buffalo Woolen Mills, plan rebuilding plant destroyed by fire Feb. 16. Loss over $100,000 with machinery.

Bessemer & Lake Erie Railroad Co., Pittsburgh, has resumed operations at repair shops at Greenville, Pa., following shut down for several weeks, recalling over 800 men.

Latrobe Brewing Co., Latrobe, Pa., has been organized by C. S. Miller, Pitcairn, Pa., and Michael A. Williams, Scottdale, Pa., to operate a brewing plant at or near Latrobe.

Common Council, West Kittanning, Pa., is planning installation of 200,000-gal. storage tank, pumping machinery and other equipment for water supply system. Entire project will cost $49,000. Morris Knowles, Inc., Westinghouse Building, Pittsburgh, is consulting engineer.

Biggs Boiler Works Co., Akron, Ohio, is increasing production schedule. Company recently secured order from Government for steel buoys, totaling about $50,000.

Ohio Brass Co., Mansfield, Ohio, manufacturer of transportation equipment for electric railways, has sold plant and property of subsidiary, Canadian Ohio Brass, Ltd., Niagara Falls, Ont., to Welland Securities, Ltd., Niagara Falls, which will use property for another purpose. Later, selling company plans erection of new plant at same place, with increased production facilities.

Akron Heated Steering Wheel Co., Akron, Ohio, care of Ernest L. Cunningham, 1422 First Central Trust Building, representative, has been organized by Carl A. May and Frank B. Killian, Akron, to manufacture mechanical equipment.

Department of Public Service, Dover, Ohio, C. H. Krantz, director, is planning extensions and improvements in municipal electric light and power plant, including additional equipment. Waldo Hartline is engineer.

Ohio Metal & Mfg. Co., Dayton, Ohio, has leased new two-story building, 100 x 250 ft., with foundations for third story later, to be erected on East Monument Street by Martin Realty Co. It will cost about $30,000. Portion of unit will be used for storage and distribution. William Ward, Mutual Home Building, is architect.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until March 7 for one motor-driven brake drum grinder and one motor-driven brake shoe grinder (Circular 387), 36 dial test indicators (Circular 408), 224 spray type engine cleaners (Circular 409); until March 8, one motor-driven shaper (Circular 397), 60,000 ft. aircraft and lighting cable (Circular 414), 10 radiator assemblies (Circular 398), 10 streamline wheels, 10 brakes and two control units (Circular 142), aluminum burr washers, lock washers, plain washers, etc. (Circular 405); until March 13, 980 carbon steel taper pin reamers (Circular 429).

Union Bottling Works, Blue Rock and Delaney Avenues, Cincinnati, has plans for two-story addition. Cost about $35,000 with machinery. Stanley Phillips, 1103 Elberon Avenue, is architect.

Acme Radio Mfg. Co., Miamisburg, Ohio, has been organized by Curt H. Hockner and Lawrence Bover, Miamisburg, to manufacture radio equipment and parts.

Tri-State Brewing Co., Columbus, Ohio, has plans for plant expansion and modernization, including additional equipment. Cost over $350,000 with machinery. Harry Roderick, Columbus, is architect.

Economy Chuck Corpn., Indianapolis, has been organized by John W. Altmyer and Floyd Snyder, Greenfield Line, Indianapolis, to manufacture chucks and kindred specialties.

Penton Products Co., 2421 Smith Street, Detroit, has plans for a new eight-story brewing plant. Cost about $400,000 with machinery. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

Detroit Edison Co., 2000 Second Street, Detroit, is arranging 1933 expansion and improvement program, including rebuilding work at power plant at Connors Creek, installation of additional equipment at No. 3 Delray power plant, extensions in power substations, transmission and distributing lines, and other work. Entire project will cost over $2,500,000.

Riordan Machinery Co., Detroit, has been organized by John M. Riordan, 2233 Tuxedo Avenue, and associates, to manufacture machinery and parts.

Muskegon Bennett Corpn., Muskegon, Mich., recently organized by Thomas B. Bennett, Muskegon, organizer and former head of Bennett Pumps Corpn., same city, plans early operation of local plant for manufacture of oil and grease pumps, tanks and kindred equipment. A. L. Wertz, formerly identified with Merit Equipment Co., 3860 East Ninety-first Street, Cleveland, will be an official of new company. Mr. Bennett will be president.

Klaas Machine & Mfg. Co., 4313 East Forty-ninth Street, Cleveland, manufacturer of pickling equipment, has consolidated with Weaver Brothers Co., 9315 Sandusky Avenue, Cleveland.

Metalcrafts Co., Cincinnati, recently organized by H. Meierjohan and E. Wengler to manufacture art metal products, has established a plant at 712 Reading Road and is in operation.

SOUTH ATLANTIC

Belcher Oil Co., 1217 Biscayne Boulevard, Miami, Fla., has plans for new bulk oil storage and distributing plant on 8-acre tract at Port Everglades, Fla. Cost over $50,000 with pipe lines, etc.

Glover Machine Works, Inc., Atlanta Street, Marietta, Ga., manufacturer of machinery and parts, has acquired property near Cordele, Ga., and soon will begin erection of new plant. An electric furnace with auxiliary equipment will be installed. Present works will be removed to new location. Cost close to $40,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until March 10 for one meter-testing table, three transformers, each

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To put it another way, we try to produce iron and steel sheets that are easy on expensive dies, that increase your prime yield, that enable you to consistently make a finer, more salable product—at less cost.

Perhaps you will be willing to give us an opportunity to do these profitable things for you. Tell us, or better, show us, what you are fabricating or intend to fabricate from sheet metal. An experienced Armco man will recommend the grade or grades best suited to meet your particular needs. Just get a note off to our nearest office —today.

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333 kva., oil circuit breakers and other equipment (Circular 2838).

Board of District Commissioners, District Building, Washington, asks bids until March 6 for gate valves, from 16 to 30-in. diameter.

American Oil Co., American Building, Baltimore, has work under way on new bulk oil storage and distributing terminal at Richmond, Va. Cost over $70,000 with tanks, pumping machinery and other equipment.

Chief of Engineers, Army Department, Munitions Building, Washington, asks bids until March 13 for three trailers (Circular 23).

Board of Water Commissioners, Macon, Ga., C. T. Williamson, chairman, asks bids until March 14 for equipment for municipal waterworks. Wiedeman & Singleton, Candler Building, Atlanta, Ga., are consulting engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 7 for light and power cable (Schedule 9674), four motor-driven boiler tube-cleaning outfits and spare parts, and 280 sets wire boiler tube brush sets (Schedule 9682) for Norfolk Navy Yard; 16,000 lb. aluminum alloy ingot (Schedule 9671) for Washington yard; one motor-driven turbo - compressor (Schedule 9646), fire extinguishers, continuous foam generator (Schedule 9669), aircraft protractors (Schedule 9577), one double-spindle shaper (Schedule 9606) for Eastern and Western yards; until March 14, 6720 steel wire casting brushes, 25,606 steel wire cleaning brushes and 2244 hand platers' brushes (Schedule 9651) for Brooklyn, Sewalls Point, Washington, Great Lakes, Puget Sound, Mare Island, San Diego and other yards; 620 cutting and welding regulators, 1000 discharge valves, 120 air gages, 330 steam and vacuum gages, 50 bronze water gages (Schedule 9665) for Brooklyn, Norfolk and Mare Island yards.

◀ MIDDLE WEST ▶

Paul Gerhardt, 64 West Randolph Street, Chicago, architect and engineer, has asked bids on general contract for new brewing plant at Seventy-fourth and Kimbark Streets, for company whose name is temporarily withheld, to occupy tract, 300 x 350 ft., with power house, pumping plant, refrigerating plant and other units. Cost about $1,000,000 with machinery.

Best Brewing Co., 1317 Fletcher Street, Chicago, has plans for extensions and improvements, including additional equipment. Cost over $200,000 with machinery. Company was organized recently by officials of Best Malt Products Co., same address; Charles Hasterlik is president. Newhouse & Bernham, Inc., 8 South Michigan Avenue, are architects.

Automatic Valve Corpn., 1301 Carroll Avenue, Chicago, has been organized by R. H. Hubbell and M. E. Mahoney to manufacture valves and kindred products.

K. O. Lee & Son Co., Aberdeen, S. D., manufacturer of motor tools and equipment, is planning to rebuild part of machine shops and mechanical division, recently destroyed by fire. Loss over $40,000 with equipment.

City Council, Rockford, Iowa, has been authorized to arrange a bond issue of $105,000, fund to be used for a new municipal electric light and power plant. H. L. Cory Co., Redick Tower, Omaha, Neb., is consulting engineer.

Bureau of Reclamation, Denver, asks bids until March 10 for erection of structures on laterals, Gooding Division, Minidoka project, Idaho; including installation of 12 to 24-in. diameter corrugated metal pipe, 4000 lb. gates and gate hoists, 5500 lb. steel reinforcing bars, etc. (Specification 587-D).

Common Council, Ord, Neb., plans call for bids early in March for new municipal electric light and power plant and water system. Cost over $80,000. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

Stetson Brewing Co., 1742 North Winchester Street, Chicago, has awarded general contract to Anthony Bezchleba and Frank B. Sedlak & Sons, 2448 South Lawndale Street, for extensions and improvements in brewing plant. J. T. Fortin, 600 Blue Island Avenue, is architect.

Department of Public Works, City Hall, Sioux City, Iowa, M. P. Smith, commissioner, in charge, plans electrification of municipal pumping plant for water system, including equipment for capacity of about 7,000,000 gal. daily. Cost about $30,000.

Milcor Steel Co., 4100 West Burnham Street, Milwaukee, manufacturer of steel building supplies, has acquired Richto Metal Trim Co., Aurora, Ill., to round out present fireproofing line. Richto plant is being transferred to Milwaukee and O. G. Taecke, general manager, will become manager of metal trim division of Milcor company. Louis Kuehn is president.

Rasmussen Machine Works, Fifth and Main Streets, Marinette, Wis., suffered almost total loss by fire Feb. 10. Considerable new machinery was recently installed. Company plans to rebuild immediately.

Janesville Fence & Post Co., Janesville, Wis., manufacturer of woven wire fencing, barbed wire fencing and steel posts, is reopening plant March 1 on accumulation of orders for spring delivery. James B. Harris is general manager.

◀ SOUTHWEST ▶

Shell Petroleum Corpn., Shell Building, St. Louis, plans rebuilding part of bulk gasoline storage plant at Roxana, Okla., recently damaged by fire. Loss about $50,000 with tanks and equipment.

City Council, St. Charles, Mo., has called a special election on March 11 to approve bonds for $300,000 for a municipal electric light and power plant. Russell & Axon, Roosevelt Building, St. Louis, are consulting engineers.

Board of Works, City Hall, Topeka, Kan., plans erection of new pumping plant in connection with extensions in sewage system in North Topeka district. Bids will be asked early in spring. W. E. Baldry is engineer.

Board of Education, Little Rock, Ark., contemplates installation of manual training department in connection with rebuilding junior high school on East Side, for which general contract has been let to George H. Burden, National Standard Building. Cost about $100,000 with equipment. Mann, Wanger & King, Donaghey Building, are architects.

Constructing Quartermaster, San Antonio, Tex., asks bids until March 14 for steel tanks for gasoline storage at Duncan Field, Tex. (Specification 9379).

Livingston Shipbuilding Co., Orange, Tex., has been organized by G. M. Livingston and E. W. Brown, Jr., Orange, to operate a shipbuilding and repair plant.

Common Council, Glen Rose, Tex., plans installation of a 50,000-gal. capacity steel tank on elevated steel tower, pumping machinery and other equipment in connection with municipal water and sewage systems. Fund of $45,000 has been approved for project.

Marathon Oil Co., Fort Worth, Tex., has begun an expansion and improvement program at oil refinery. Cost more than $650,000 with equipment. Headquarters are at Tulsa, Okla.

◀ NEW ENGLAND ▶

Board of School Trustees, Quincy, Mass., Public Building Department, City Hall, in charge, plans manual training department in addition to junior high school at North Quincy. Cost about $300,000. Frank Irving Cooper Corpn., 47 Winter Street, Boston, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 7 for ball bearings (Schedule 9645) for Newport, R. I., Navy Yard.

Amesbury Metal Products Co., Amesbury, Mass., has been organized by John J. O'Brien, 5 Estes Street, and associates, to manufacture vending machines and other metal products.

Connecticut Light & Power Co., Hartford, Conn., plans extensions and improvements in power station and system at Glastonbury, Conn., and vicinity. Cost over $40,000 with equipment.

Town School Board, Middletown, R. I., plans manual training department in new three-story high school, on boundary of Middletown and Portsmouth, R. I., to serve both communities. Cost about $165,000. E. M. Corbett, 49 Purchase Street, Fall River, Mass., is architect.

◀ SOUTH CENTRAL ▶

City Council, Starkville, Miss., is planning installation of a municipal electric light and power plant and distributing system, using Diesel gas engine units for prime movers. Cost about $100,000 with equipment.

American Potash & Super-Phosphate Corpn., Canal Bank Building, New Orleans, L. M. Turnbull, general manager, recently organized, has acquired property near Crystal River, Fla., for erection of new plant for manufacture of potash, to include power house, machine shop, pumping plant and other structures. Cost close to $175,000. Company will build another plant near New Orleans later. Joseph B. Gaffney will be engineer and general superintendent.

Simrall Refining Co., Horse Cave, Ky., has plans for new oil refinery near Owensboro, Ky., with initial capacity for handling about 2000-bbl. crude oil a day. Cost over $90,000 with machinery. Headquarters are in Union Central Building, Cincinnati.

Louisville Water Co., Louisville, is planning extensions in water supply system in suburban districts, including installation of 24-in. and smaller pipe lines and other mechanical equipment. Cost about $85,000.

◀ PACIFIC COAST ▶

Board of City Directors, Pasadena, Cal., has engaged Robert H. Ainsworth, Central Building, architect, to draw plans for municipal power substation on property recently acquired at Lamanda Park, for Pasadena Light and Power Department. Cost about $375,000 with equipment.

Southwest Brewing Co., Tucson, Ariz., William E. Gleason, president, recently organized by Mr. Gleason and associates, is considering erection of new multi-story brewing plant, with power house, refrigerating plant and other units. Cost about $160,000 with equipment. Paul Engstrom, Tucson, is vice-president of new company.

Quartermaster, Fort Huachuca, Ariz., asks bids until March 9 for wire and cable, switches, terminals, conduits and other supplies, totaling 105 items in all (Circular 6).

Empire Tool & Mfg. Co., Los Angeles, care of Glen Behymer, 1215 Rives-Strong Building, representatives, has been organized by Robert M. Marks and Irving S. Metzler, Los Angeles, to manufacture tools and mechanical equipment.

International Wood Products Corpn., care of F. W. Horskotte, American Bank Building, Portland, Ore., architect and engineer, plans power house and machine shop at new box and shook manufacturing plant at Cathlamet, Wash. Cost about $100,000 with equipment. H. E. Leash, Clear Lake, Cal., is president.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 14 for one motor-driven dowell machine (Schedule 9672), 12 equipments for air ejectors and spare parts (Schedule 9661), two motor-driven engine lathes (Schedule 9675), three motor-driven sensitive drilling machines (Schedule 9677) for Puget Sound Navy Yard; storage battery groups and straps, separators, etc. (Schedule 9648); 1500 lb. sheet brass, 4220 lb. sheet copper (Schedule 9676), 5000 lb. copper-nickel alloy bar (Schedule 9655), 9900 lb. admiralty metal evaporator tubing (Schedule 9683) for Mare Island Navy Yard.

Continental Specialties Co., Ltd., Los Angeles, recently organized, is establishing plant at 1367 East Seventh Street for manufacture of metal partitions and other metal building products. E. B. Taylor and George W. Mayne head new company.

Producers' Cooperative Packing Co., 1695 North Commercial Street, Salem, Ore., will take bids soon on general contract for rebuilding two-story food products canning plant recently destroyed by fire. Cost about $50,000 with equipment.

◀ FOREIGN ▶

Bowaters Mersey Paper Mills, Ltd., Ellesmere Port, England, has disposed of a stock issue of £800,000 (about $2,752,000), to be used in part for mill expansion and improvements, including installation of new machinery. Entire program will cost in excess of amount noted.

Ministry of Interior, Government of Brazil, Rio de Janeiro, will ask new bids soon for electrification of Brazilian Central Railway. Bids submitted several months ago have been rejected. Transportation Bureau of Government is in charge.

Okura Gumi, Ltd., Tokyo, Japan, operating industrial properties, is organizing Tokai Fiber Co., a subsidiary, to establish mill for production of fiber products, designed as raw material for textile manufacture. Initial works will cost over $100,000 with machinery.

Oxwelding helps « « «

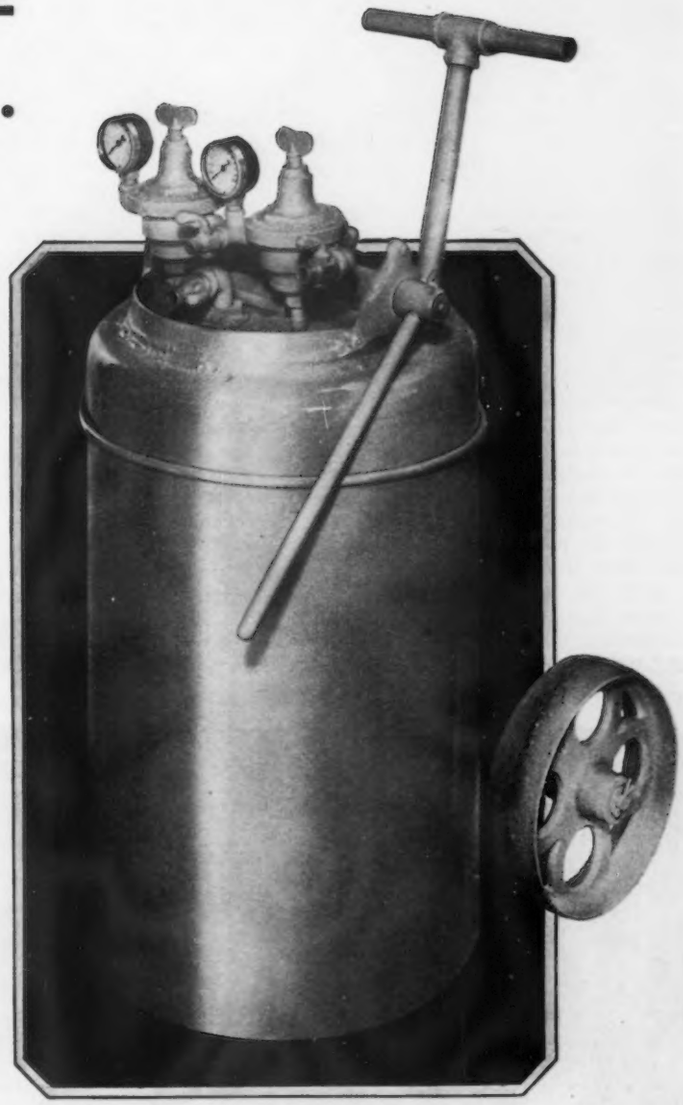
IN PROFITABLE REDESIGN . . . . .

OXWELDING has enabled many manufacturers to turn out better metal products, often at lower cost, because it offers economies in production as well as complete freedom in design. Oxwelded joints assure the full rated strength of steel, or other materials. They can be made smooth and flush,—finishing is quicker and less expensive.

For instance:—A manufacturer of paint spraying equipment wanted a better joint for attaching chrome-molybdenum flanges to steel tanks. An oxy-acetylene welded joint proved more efficient and less costly.

But this was only a beginning. A Linde representative proposed redesign for welding,—relocating the cover flange joint to permit welding from the inside. This eliminated grinding which formerly was necessary prior to painting the tank. The use of a bronze welding rod, which was also suggested, required 17 minutes less welding time per tank and gave ample strength.

If you feel that redesign might improve your product, ask any Linde District Office how to obtain the full benefits of oxwelding and cutting. Write or 'phone, now.



Welding reduced the cost of the cover flange joint in this paint sprayer 68 per cent. Finishing costs were reduced approximately the same.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

126 Producing Plants UCC 627 Warehouse Stocks

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Cleveland	Milwaukee	Seattle
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LINDE OXYGEN • PREST-O-LITE ACETYLENE • OXWELD APPARATUS AND SUPPLIES • UNION CARBIDE

3-D

Cars Scrapped in Giant Baling Press, Melted in Huge Open-Hearth

(*Concluded from page* 353)

foundation under the slag pockets, is 100 ft.; the width is 25 ft.

An electrically-operated induction draft fan is mounted on the charging platform adjoining the furnace stack to take the waste gases from the boiler to the stack. There also is a force draft fan located at the same place to supply air to the furnace for combustion purposes. At each end of the furnace are two tar burners capable of burning 400 gal. of tar per hr. However, the furnace can be fired with tar, oil or gas. One section of the charging floor, 24 in. wide and running full length of the furnace, is attached to the bottom of the buckstays, tilting with the furnace and providing clearance for the rockers at the time of pouring. It is also an advantage when the furnace is slagged.

Boilers with a combined capacity of more than 1100 hp. take advantage of the waste heat coming from the furnace to generate steam which is used in powering a 1000-ton shear operated to cut heavier types of scrap or to supply the main steam lines for general plant purposes.

Although the furnace is termed a 400-ton furnace, this figure refers to the amount of molten steel it will hold and not to its finished heat capacity, which is slightly less than 400 tons. That is, the main purpose of the furnace is to melt the scrap from old cars, with only slight chemical reactions taking place during the melting process.

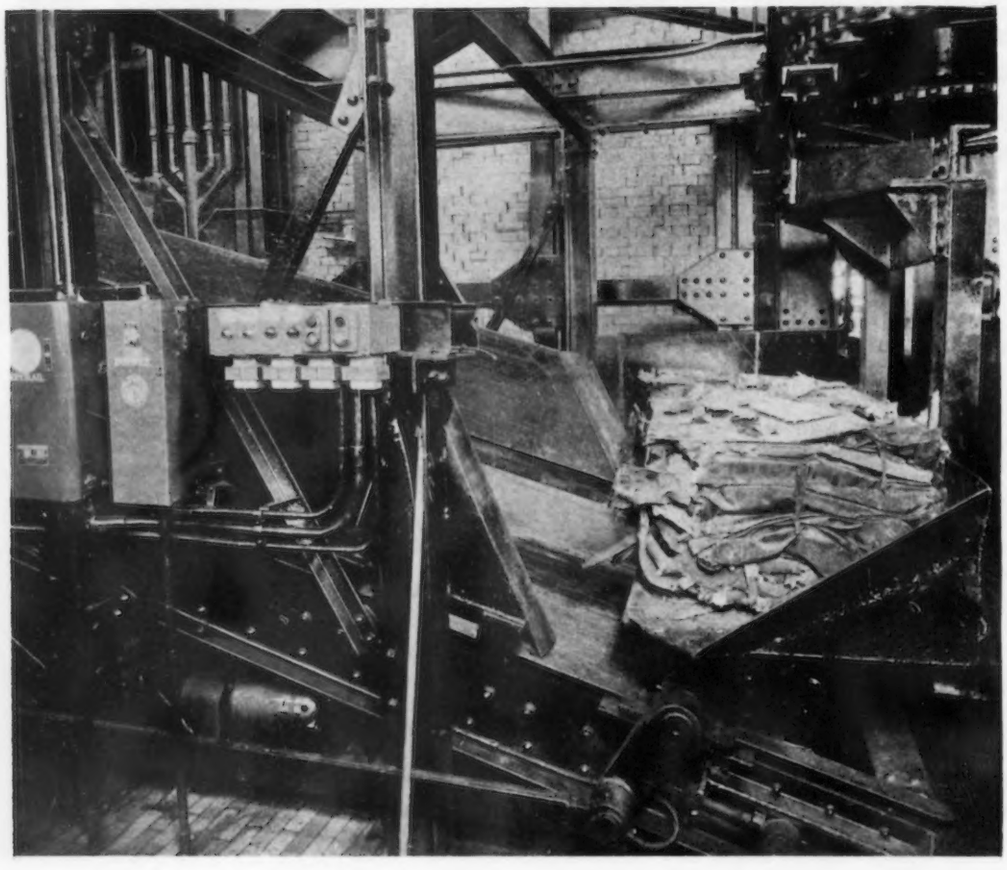
There are two 600-ton storage mixers of the barrel type. These are merely repositories for the hot metal which comes from the blast furnaces, keeping it at a uniform temperature during the interim before it is taken to the open-hearth furnaces. They are equipped with the latest type of safety air return engines.

Installation of the large open-hearth furnace, functioning as it does in conjunction with the battery of nine smaller furnaces which do the actual refining of the steel, has lowered the cost of making steel at the Rouge plant. Melting facilities have been increased by 600 tons, bringing the total ingot capacity to approximately 2600 tons every 24 hr. Instead of pouring a heat every 12 hr. as was formerly the custom, the furnace cycle is now 9 hr.

The furnace, hot metal mixers and baling press were installed at a cost of $500,000. This equipment has greatly facilitated the handling of old cars, of which 72,623 have been scrapped in the past two years. The industry's ideal is to scrap one old car for every new car which is produced, and the program now being carried out by the Ford Motor Co. has advanced the industry a long way toward its ultimate goal.

Republic Steel Corpn. in 1932 had a net loss of $11,261,194 after preferred dividends on guaranteed stock of the Trumbull Cliffs Furnace Co. This compares with a loss of $9,034,-152 in 1931. Losses from operations were $90,687, after deducting charges for maintenance and repairs of plants amounting to $3,015,440. Interest on indebtedness was $3,368,323. Provision for depreciation and renewal of plants and for exhaustion of minerals was $7,510,831, making a net loss from operations of $10,969,843. A better showing was made in the fourth quarter, when the net loss was $2,620,722, than in the third quarter, when the loss was $3,419,350. The loss during the last quarter was also less than during the second quarter but slightly higher than during the first quarter.

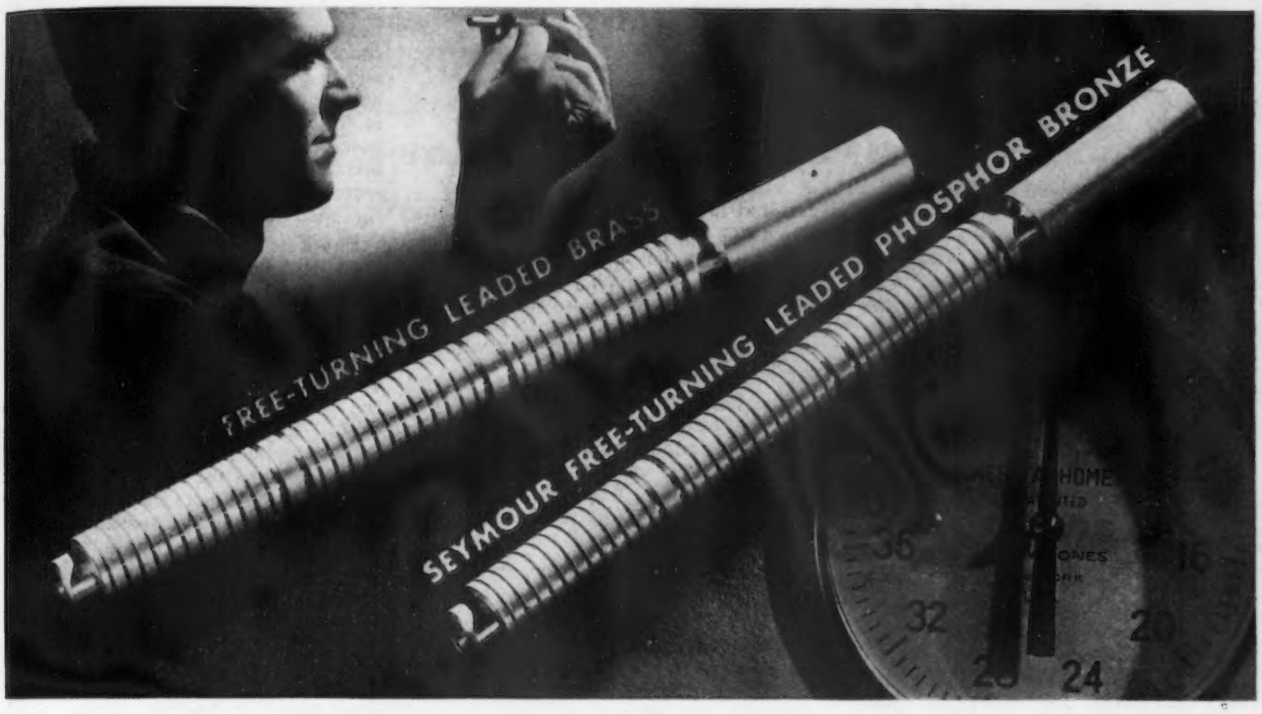
• Emory Pipe & Foundry Co., Anniston, Ala., is building a new plant to replace the one destroyed by fire last summer. The main foundry building will be 263 ft. long by 116 ft. wide. Construction work on this unit is now in progress. Machine shop and pattern shop buildings were recently completed.



▲ ▲ ▲

HOW an old car looks after it emerges from the press in a bale 2½ ft. long, 6 ft. 2 in. wide and 30 in. high. It is taken by conveyor from this point to the open-hearth department floor.

▼ ▼ ▼



From Brass to Phosphor Bronze on the Same Set-up!

WE wanted to prove that Seymour Phosphor Bronze has much to offer the man who may have had trouble in speeding up bronze precision turning.

So, finding one of our customers in production on the brass radio condenser shaft illustrated above, we asked him to change from brass to our free-turning, leaded Phosphor Bronze rod, but, *without altering set-up, tools or speed.* He did so, and the Phosphor Bronze shafts, in tolerances, were exact duplicates of the brass!

This shaft is an intricate affair. The slots have to be held to .0005 and the diameter at bottom of slots to .001, plus or minus—this in spite of a 4⅞" length which offers enough "give" to destroy tolerances if tools get dull.

We do not offer Seymour Phosphor Bronze rod as a regular substitute for brass, but rather as a stock that will stand more rapid working than ordinary bronze. This brass job was duplicated merely to prove that point.

If slow production has prevented you from specifying Phosphor Bronze where it belongs, our engineers would like very much to analyze and figure on your next contract.

FOR SERVICE

THE SEYMOUR MANUFACTURING CO., 24 FRANKLIN ST., SEYMOUR, CONN.

SEYMOUR

SHEETS, WIRE, RODS

PHOSPHOR BRONZE

ALSO: NICKEL SILVER SHEETS, WIRE, RODS : AND NICKEL ANODES

Steps Taken In Making a Job Time Study

(*Concluded from Page* 351)

occurred in the whole study, gave an average elapsed time of 0.00214 hr. Since this average time is to be multiplied by a leveling factor and then increased by an allowance percentage, it is well, for the sake of accuracy, to carry as many places as can be conveniently read on a slide rule. The final time value or the allowed time for each elementary operation need be given only to the nearest fourth decimal place.

By glancing over the list of elapsed-time values, the minimum or lowest time in which each elementary operation was performed is readily apparent. These values are recorded on the fourth line of the summary. Likewise, the maximum values are selected and recorded on the fifth line. These values are not actually used to determine the final allowed time, but they are convenient for reference purposes, and too great a difference in them may justify further investigation.

Computing the Leveling Factor

As previously explained, the factor by which the average time is multiplied in order to determine leveled time is called the leveling factor. By referring to the lower right-hand corner of the observation form, Fig. 1, the general rating of these four points will be found. Except for those elementary operations that have been individually rated, this general rating is used for the entire study. Exceptions would have been indicated in appropriate columns in the seventh line of the summary.

Each symbol used to express this rating has a corresponding numerical value, as shown on the Performance-Rating Table (Fig. 2). The algebraic sum of these numerical values added to 1.0 gives the leveling factor, which is recorded in the space reserved for that purpose. Since a general rating has been applied to the entire study, there is, of course, a general leveling factor. In this case, it is not necessary to record it for every elementary operation.

The leveling principle is now applied. As previously explained, the average time represents the actual performance level and includes, in the aggregate, all of the effects of variations from normal skill, normal effort, normal conditions and normal consistency. Each average elapsed time is multiplied by the appropriate leveling factor, and the result is recorded in the eighth line of the summary.

If workers were able to work continuously, the leveled time would be the correct value to allow, but constant application to the job is neither possible nor desirable. In the course of a day, there are bound to be occasional interruptions and delays, for which due allowance must be made in establishing the time value. Each elementary operation is considered separately and the appropriate allowance recorded in the next to the last line in terms of a percentage by which the leveled time is increased.

The time allowed for each elementary operation is recorded in the last line of the summary in decimal hours. It is the result after the leveled time has been increased by the allowance percentage. This value becomes a part of the allowed time for the operation as calculated on the back of the sheet.

The numbers and descriptions of the elementary operations are transcribed on the back of the sheet. The majority of future references will be made to this part of the job study. Descriptions of the elementary operations are elaborated upon where it adds to the clearness. The time allowed for each elementary operation is transcribed to the column reserved for that purpose. In the next column to the right is noted the number of times the elementary operation occurs on the piece or cycle of the operation. Extensions of the total time allowed for each elementary operation are made and recorded in the last column. Elementary operations that occur but once are carried over as they appear in the Time Allowed column. The times allowed for those occurring more than once are multiplied by the number of times they occur and the product carried over. The allowed time for the operation is then the sum of the items in the last column. Fig. 3 shows the model job study with the back of the sheet completely filled out.

Determination of Allowances

An allowance is extra time which is added to the leveled time to care for various items which require the operator's time and which are not a regular part of any one job. The determining and making of correct allowances are very important steps in this work. A thorough study of the conditions surrounding the job must be made to determine the kind and amount of allowances to add in all cases.

When the observation is made, time for performing all foreign elementary operations is deducted. The workers often question the justice of this since they realize that some of the delays, although not strictly a part of the job, are entirely unavoidable. The purpose of the study is to determine the leveled time for the performance of the job, exclusive of everything that is not regular, and the observer should explain that all necessary and unavoidable delays are considered in allowances which are added to the leveled time to arrive at the allowed time. Sometimes it is well to go into detail and explain how allowance percentages are determined, and, in addition, show the amount of allowances which is made for each delaying factor.

The kind and the amount of allowances to be made have not been estimated nor decided in an arbitrary manner, but are the result of thorough analysis and careful study. A number of individual workers were studied for several weeks, and while the studies were being taken, the overall time for each piece was noted as such and all delays were listed in the columns for foreign elementary operations. When the columns for foreign elementary operations were filled, several columns in the body of the form were roughly blocked off in pencil and used for noting additional foreign elementary operations. These studies extended continuously over full working days, and a careful watch was kept of every move made by the operators.

Delays Classified

After the observation was completed, the delays were classified as personal, unavoidable, special and unnecessary. Unnecessary delays or delays which were purposely introduced by the operator were not considered in establishing allowances, and the time thus consumed was subtracted from the length of the working day before computing the other percentages. The time lost due to the other delays was totaled and the percentage thus lost computed by dividing time lost by the total length of the working day less time lost through unnecessary delays. After delay percentages had been found from several all-day studies on different operations, the results were averaged. The percentages thus determined were established as the allowance percentages for delays within the particular class of work on which the studies were made.

Practice Becoming Widespread

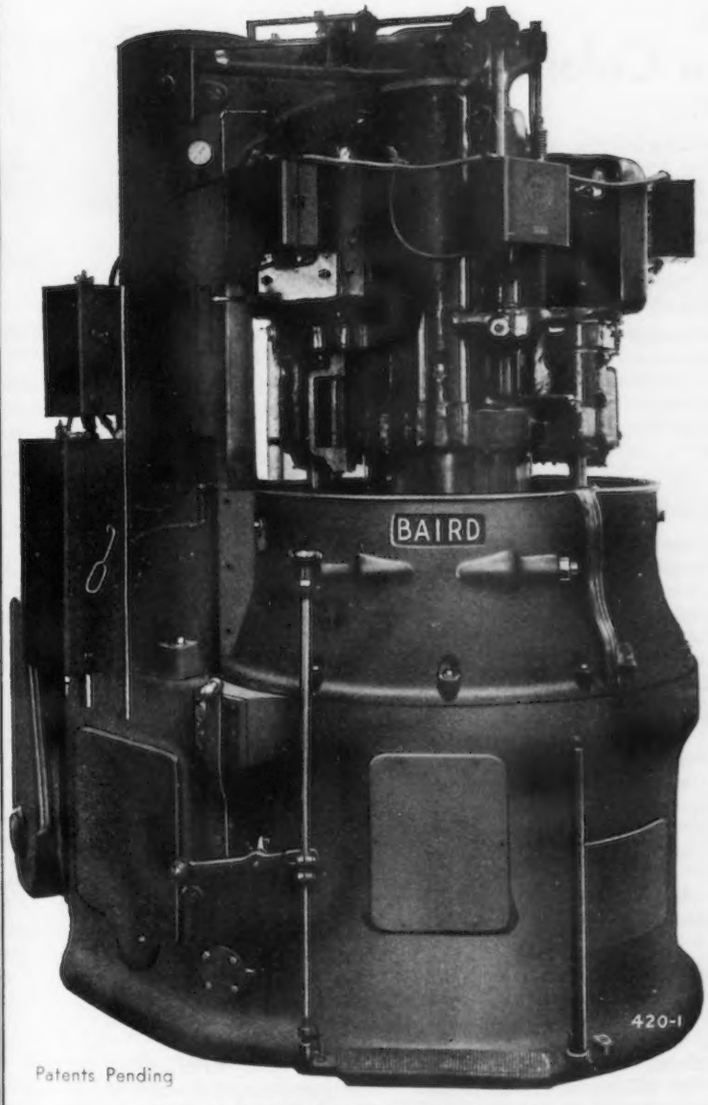
The practices here described apply to the taking and working-up of job studies at the Westinghouse plants. Experience has proved that the principles upon which such procedure is based are sound. Favorable opinions of reputable analysts and industrial men in different parts of the country have been received concerning our methods, and it appears that other plants are adopting a similar procedure.

We are not too modest to say that we believe it fits Westinghouse conditions better than any other plan so far suggested and, although minor changes may be made from time to time, the general procedure will likely remain intact for many years to come.

Another "BAIRD" machine to help make things cost less so that more can be bought and thus more people given more work mining, smelting, refining, rolling or casting the more metal needed as well as adding more work transporting, recording, packing, etc., etc., etc.

THE BAIRD 11" AUTOMATIC, 8 SPINDLE INTERNAL, VERTICAL GRINDER

EACH WHEEL INDIVIDUALLY DRESSED AND SIZED TO SUIT CONDITIONS AT ITS STATION WITHOUT CHANGE AT ANY OTHER STATION



Patents Pending

"ASK BAIRD ABOUT IT"

Each wheel may be changed or adjusted quickly and independently of any other wheel.

The size and kind and speed and amount of feed of each wheel, and the amount removed from each wheel in dressing it is entirely independent of these factors for any other wheel.

Wheels do not have to be all of the same size even for the same hole.

Two different diameters of holes may be ground in the same pass through the machine.

Machine may be set up Double Indexing and work passed through once for one size of hole at one end and immediately passed through the machine a second time to grind another size of hole in the other end.

An Exclusive Baird Method

Machine will operate within the tolerances allowed for in production of high grade machine or automobile parts, etc.

What Work Have You to Grind?

The Baird Machine Company
BRIDGEPORT, CONN.

What the Machine Has Done to Us

(*Concluded from Page* 356)

cent higher than in July, 1921, the combined index of wholesale commodity prices tended gradually downward until July, 1929, when it returned to approximately the July, 1921, level. Between 1921 and 1929, a period of eight years, no very definite long-term trend was discernible. From July, 1929, to March, 1932, prices fell sharply and almost continuously, and in the latter months were 31.6 per cent lower than in July, 1929, and 60.5 per cent lower than in May, 1920. In November, 1931, the price index returned to its 1913 level.

Summary

To sum up in brief the significance of the price level with relation to the other data to be considered—prices are the common denominator by means of which we are able to relate dissimilar things and to interpret data expressed in dollars in terms of physical volume or vice-versa. They are the means, also, by which we can compare and relate changes in the one-time period with changes in other time periods for which we have comparable data.

Prices are the analytical key by means of which we can interpret the dollar wage in terms of the real wage and measure the amount of enjoyment of life it will buy.

And, finally, declining commodity prices are one way in which the price system manifests increased efficiency in production. Declining commodity prices mean that less effort will procure more goods. If the rate of price decline is not so rapid as to destroy the value of goods on hand before they can reasonably be expected to move to consumption, then such decline may be a sign of advance rather than a sign of recession.

Dyeing Gives Aluminum a Color Finish

(*Concluded from Page* 357)

composition may be removed and the product polished and buffed. In certain cases, the entire product has been dyed, after which the edges and corners have been ground down to expose the bright metal in contrast with a colored background.

Although the color range of the dyed metal is wide, it has been found by experience that certain hues are easier to maintain at the same intensity on a quantity of a product. It is noteworthy, also, that it is not possible to dye aluminum so that the color will match with shades mixed with a considerable proportion of white, such as flesh, coral, pink, or peach. This limitation of the process is explained by the fact that the coloring is a dye in the surface of the metal, and not an opaque pigment, as in the case of lacquer or a synthetic resin enamel.

The tendency to be transparent, however, seems to have its advantages. The colored aluminum is more lively in hue than many metal coatings, as the eye sees something of the brilliancy of metal beneath, deflecting light through, rather than from, the surface.

Resists Ordinary Acids

Colored aluminum is not claimed to be resistant to strong acids or alkali, but the hard and soft finishes have been found ordinarily resistant to such weak acids as fruit juices and to alkali in compounds of soap and proprietary cleaners. With either soaps or acids, however, prolonged contact is likely to affect the surface. In cooking utensils, it has been found that the colors are generally unaffected by the heat developed in boiling on the top of a stove. For baking and roasting pans, however, the black A finish is required to meet the temperatures of an oven, often ranging from 500 to 600 deg. F. Under test, the black A grade has been raised to a red heat and cooled without apparent injury.

A disadvantage suggested by colored aluminum cooking utensils, however, is the common household use of abrasives for cleaning. Steel wool, or a gritty cleanser, would naturally wear away a surface 0.0003 to 0.001 in. deep.

Metal Cleaning Methods Important

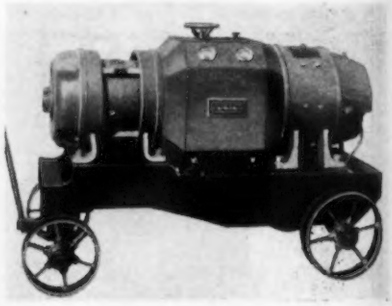
Careful metal cleaning is important in the use of the process, as all grease, oil, acid or alkaline substances must be removed before dyeing. Otherwise, spots and other blemishes are likely to appear through the colored surface.

Although dye has been applied to the alloys of aluminum, especially castings, results have not been highly favorable in all cases. This is said to be caused by the presence of copper or other metals, which are largely unaffected by the process. However, castings of aluminum containing a minimum of certain alloys have been colored with results that were considered to be satisfactory.

At present, the cost of dyeing is a factor likely to mitigate against wide use in low-priced metal products. While the expense varies with the labor involved, efficiency of equipment and the volume of products finished, it is estimated by the licensing company to cost from 50 to 100 per cent more than a lacquer or synthetic resin enamel coating. However, it is pointed out that the color results are somewhat different from colors of an opaque finish, so that those experienced in the use of color, especially for decoration, see many desirable applications for the dyed metal.

Dual-Control Arc Welder

A NEW four-bearing, self-excited dual-control arc welder, designated as the model SA, is being marketed by the Wilson Welder & Metals Co., North Bergen, N. J. This welder is designed for the high amperages and arc voltage required in speed and shielded arc welding and is said to offer the advantage of a two-unit machine with a flexible coupling, which permits changing without loss of time the motor or the generator in case of failure. The only projecting parts are control handles and these are placed so that they are safe from injury. The voltmeter and ammeter are



set at an angle to reduce the chances of damage.

All parts of the machine are accessible. By means of the dual-control system the voltage and amperage may be set independently. The instruments may be read with ease. The machine will weld at rated current in amperes, with 40 volts across the arc. It does not require an exciter, and idling loss is very low. Large overload capacity is a feature emphasized. The machine provides sparkless commutation at all loads.

The Locomotive Crane Manufacturers Association has adopted a resolution binding its members to refrain from furnishing detailed drawings of standardized products except when justified by the needs of an emergency breakdown. The locomotive crane builders take the position that this action is necessary in order to protect their customers from faulty repair work done by companies other than the original manufacturers of the cranes.

The twenty-fifth annual meeting of the Institute of Metals will be held at the Institution of Mechanical Engineers, London, on March 8 and 9, under the chairmanship of Sir Henry Fowler, president of the institute.